file

AN EVALUATION OF THE BEAR CREEK BURN AS MARTEN (*MARTES AMERICANA*) HABITAT IN INTERIOR ALASKA

FINAL REPORT

Special Project Under
Cooperative Agreement AK-950-CAH-0
Bureau of Land Management
and
Alaska Department of Fish and Game

by

Audrey J. Magoun
and
Donald J. Vernam

November 1986

CONTENTS

ACKNOWLEDGMENTS

This project was jointly funded by the Bureau of Land Management and the Alaska Department of Fish and Game. We thank Bob Pegau (ADF&G, McGrath) and Van Waggoner (BLM, Anchorage) for their generous logistical support,

field assistance, and keen interest in marten. A number of volunteers endured grueling hours of field work, miserable weather, insect harassment, and/or odoriferous laboratory tedium to help gather information for this study: Craig Altop, Warren "Ben" Bennett, Blair French, Lance Hughes, Dave Kelley, Tom Paragi, Alana Pass, and Bill Spearman. We thank them for their assistance and hope they enjoyed their time at the Pitka Fork camp. Thanks is also due to Pat Valkenburg for volunteering logistical support, field assistance, and baby-sitting duty.

ABSTRACT

Recent research has indicated that openings in mature coniferous forests may be beneficial to marten (Martes americana). Wildfire is the primary agent responsible for creating forest openings in interior Alaska; however, very few studies have focused on marten use of burns. This study was carried out in the 1977 Bear Creek burn near McGrath, Alaska. The study area was primarily black spruce (Picea mariana) forest interspersed with wet meadows and bog; white spruce (Picea glauca) forest lined the waterways. Sixteen marten were radio-tagged in and adjacent to the burn to determine movements in relation to habitat type and forest successional stage, and small mammals and berries were sampled to determine food availability in burned and unburned areas. Microtus spp. were more common within the burn, and the red-backed vole (Clethrionomys rutilus) was more common outside the burn. Small mammal trapping success was highest in the riparian white spruce stands, both burned and unburned. Berry production was quite variable, with more consistent but moderate production in unburned habitat and sporadic abundant production in burned habitat. Cover provided by dead, windthrown trees was considered to be a critical feature of marten habitat in the burn. Some marten lived entirely within the burn. Results indicate that marten are adapted to fire-driven ecosystems. Management of marten in interior Alaska, therefore, should be aimed at maintaining a mosaic of forest types through the judicious management of wildfires.

BACKGROUND

Recent reviews (Johnson 1981, Barrett and Spencer 1982, Allen 1984, Bennett 1984, Clark et al. in press) of marten (Martes americana) habitat requirements support the generally held view that marten are associated with mature forests of coniferous or mixed coniferous and deciduous tree species. Habitat suitability models for marten (Barrett and Spencer 1982, Allen 1984) have emphasized the importance of mature conifers in the canopy for optimal marten habitat. However, numerous studies have shown that marten habitat is not restricted to extensive stands of undisturbed coniferous forest (Koehler and Hornocker 1977, Soutiere 1979, Hargis 1981, Steventon and Major 1982, Spencer et al. 1983). In fact, some researchers have suggested that forest openings are desirable or even necessary features of marten habitat (Spencer et al. 1983, Buskirk and MacDonald 1984).

Wildfire is one of the primary agents responsible for creating forest openings in interior Alaska. Gabriel and Tande (1983) reported that an average of 306,700 ha per year burned in interior Alaska between 1940 and 1979. Because marten are associated with mature forests, the destruction of forests by wildfire has long been considered a major factor contributing to the disappearance of marten from much of its former range (Brabant 1922, Yeager 1950, Edwards 1954, Lutz 1956, Maxham 1970, Brown 1980). Brabant (1922) believed fires were detrimental to all furbearers, causing marked declines in harvest. Lensink (1953) concluded that treeless areas resulting from repeated fires or areas that regenerate in aspen (Populus tremuloides) and paper birch (Betula papyrifera) are abandoned by marten. Edwards (1954) stated that a fire in Wells Gray Park, British Columbia totally destroyed marten habitat for decades.

Very few studies have actually investigated marten use of burns, but recent work indicates there may be beneficial effects of wildfire on pine marten habitat. In Idaho, Koehler and Hornocker (1977) concluded that wildfire created a mosaic of forest types and a diversity of cover and

food types favorable to marten. In a food habits study, Buskirk and MacDonald (1984) found that marten prefer voles (Microtus spp.) which are generally restricted to meadow habitat types. They believe marten habitat in southcentral Alaska is related to the availability of meadows and other nonforested habitat, and, as a consequence, suggested that management of marten habitat take into consideration factors affecting the availability of early successional stages. From a questionnaire concerning furbearer use of burns in Alaska, Stephenson (1984) found that most trappers considered wildfires beneficial to marten. Marten were reported using burns extensively as early as 1-3 years postburn, with dense populations as early as 3-5 years postburn. The relative abundance of voles resulting from the dense herbaceous plant cover was cited as the major reason for the abundance of marten in burns.

In Alaska, habitat management agencies are taking into consideration the importance of wildfire to marten habitat. Current Alaska State furbearers management policies (Alaska Department of Fish and Game 1980) recognize the role of fires in maintaining habitat diversity which, in turn, allows for high microtine prey populations in subclimax communities, but the policies also call for maintenance of old-growth forests, specifically for marten. The management policies specifically state that marten are "particularly susceptible to forest fires" and that "in northern interior Alaska extensive burns have resulted in reduced populations of martens over large areas." The Alaska Interagency Fire Management Plan states that "the mosaic created by small fires or fires with unburned inclusions of spruce probably benefit marten populations more than they harm them" (Tanana/Minchumina Fire Planning Team 1972).

The fire suppression agencies in Alaska no longer have the relatively simple mandate to suppress all fires, but must respond as service organizations to the complex demands and objectives of many new and old land managers (Tanana/Minchumina Fire Planning Team 1982). One of the general guidelines in the Alaska Interagency Fire Management Plan is that the "boreal forest is a fire-dependent ecosystem, which has evolved in

association with fire, and will lose its character, vigor, and faunal and floral diversity if fire is totally excluded." Under this relatively new plan, portions of interior Alaska's boreal forest will be allowed to burn periodically. Each land manager can apply the various fire management options, from "critical protection" to "limited action," according to his own land use objectives and constraints. To select the appropriate fire management option, land managers need to understand the manner in which fire alters wildlife habitat. This study was designed to aid land managers in predicting the potential effects of fire on pine marten habitat. Specifically, the objective of the study was to determine the effect of the Bear Creek burn during an early successional stage (7-10 years postburn) on pine marten habitat use, movements, and activity.

STUDY AREA

The study area was located at the northern end of the 1977 Bear Creek burn, 10 km south of Nikolai, Alaska and 45 km east of McGrath, Alaska, near the junction of the Salmon River and the Pitka Fork of the Kuskokwim River (Fig. 1). A detailed description of the preburn vegetation and fire history of the area is presented in Hanson (1979). The preburn vegetation was primarily coniferous forest, shrubland, and sedge tussock communities. Poorly drained soils underlain by permafrost characterized the entire burn, but the study area at the northern end of the burn was considered very poorly drained resulting in more lakes, ponds, sloughs, and bogs than other portions of the burn. Elevation at the northern end of the Bear Creek burn was 122 m to 152 m and increased to 366 m at the southern end with an average gradient of less than 5.6 m/km (Hanson 1979). The fire burned 140,000 ha under a variety of severities and intensities. Live trees in the form of "stringers" along waterways or as isolated stands that survived the fire ("inclusions") were common in the burn. Segments of the study area were broadly categorized as burned, unburned, or partially burned. Burned areas had some live trees but they were confined to stringers or inclusions. Partially burned areas had at

least 50% live trees which were evenly scattered throughout the area with usually no clear definition between burned and unburned stands.

METHODS

Vegetation Sampling

Classification of vegetation was carried out in 2 locations in the study area (Fig. 1). The sampling sites were based upon the home range polygons of 2 radio-tagged marten (M5 and M3) tracked from April through July 1984. Along the Lower Pitka River (Sampling Site #1), the majority of the closed (60-100% cover) white spruce (Picea glauca) stands along the Pitka Fork remained unburned. There were numerous and sizable unburned inclusions in the burned areas. Along the Upper Pitka Fork (Sampling Site #2), the riparian closed white spruce stands were entirely burned. The few inclusions were quite small, containing less than 10 live trees. Sampling was carried out in both burned and unburned habitats.

Transects were drawn at 0.1 km intervals across the 2 sampling sites and a random sample of these transects was selected. Sampling points were randomly selected along these transects from a series of points positioned along the transects at 0.1 km intervals. Fifty vegetation plots were selected at Sampling Site #1 (Fig. 2) and 19 vegetation plots were selected at Sampling Site #2 (Fig. 3). The sample size comprised 7% of the total possible sampling points for each location.

In general, the method of vegetation sampling followed Foote (1983) using a nest of 3 plots at each sampling point. A 1-m^2 plot was used to estimate cover of low-growing vegetation, exposed ground surface, and litter. A 4-m^2 plot was used to estimate cover and to count stems of tall shrubs and tree seedlings (Ohmann and Ream 1971). The point-centered quarter plotless method described by Cottam and Curtiss (1956)

was used to count and measure live saplings, live trees, and standing dead trees.

Some variations of Foote's (1983) methods were devised to further sample features of the habitat that might be important to marten. For example, the maximum height above ground level and the diameter of dead and down trees was measured on the 1-m^2 plots to give some indication of the amount of cover provided by windthrown trees. The diameter of the downed trees was measured at the maximum diameter that occurred on the plots and does not represent the dbh (diameter at breast height) of the tree.

Radio-tagging

Marten were livetrapped in single- and double-door wire livetraps (18 cm x 18 cm x 61 cm and 28 cm x 28 cm x 91 cm) and run into a wire cone where they were weighed and then anesthesized with 0.4 ml xylazine hydrochloride (Rompun, Cutter Laboratories, Shawnee, Kans., 20 mg/ml), 0.5 ml ketamine hydrochloride (Vetalar, Parke-Davis and Co., Detroit, Mich., 100 mg/ml), and 1.0 ml atropine sulfate (Atropine, Northwest Veterinary Supply, Portland, Oreg., 0.5 mg/ml). This dosage kept the animals under heavy sedation for approximately 45 minutes during which a radio transmitter was surgically implanted in the peritoneal cavity. The 151 MgHz transmitters (IMP/200/L), purchased from Telonics (Mesa, Ariz.), weighed approximately 26.5 gm and were 6 cm long and 2 cm in diameter. Sterile surgical techniques were used to implant the transmitter through a 3-cm incision located approximately 1 cm posterior to the last rib. The method of making and suturing the incision was similar to that used by Eagle et al. (1984). The surgical procedure lasted approximately 20 minutes. The marten were ear-tagged using standard size plastic rototags purchased from Nasco West (Modesto, Calif.). After attachment, the eartags were trimmed to half the original size with wire cutters. A premolar was pulled, if possible, to determine age, and body measurements were taken. The marten were released from 3-12 hours after surgery.

Radio-tracking

A PA-18 Super Cub equipped with H-style antennae (Telonics, Mesa, Ariz.) was used for most aerial radio-tracking. Sufficient passes were made over the radio signal to pinpoint the marten's location to within 10 m of the exact location. Accuracy was checked on the ground a number of times. The location and habitat type were noted on 1:63,360 aerial photographs.

Radio-tracking on the ground for the purpose of determining daily movements and resting sites was carried out by D. Vernam and is the subject of his Masters Thesis (University of Alaska, Fairbanks).

Estimating Food Availability

Because few marten were taken by trappers in the Bear Creek burn, marten gastrointestinal tracts were not available for determining the diet of marten in the burn, nor were scats found in sufficient numbers to analyze marten food habits. Therefore, small mammal traplines were established to sample the availability of small mammals inside and outside the burn, and vegetation transects were used to estimate berry abundance. In addition, marten carcasses were purchased from a trapper whose trapline was located outside the burn 15 km west of the study area to determine the diet of marten adjacent to the burn and compare it to the small mammal population within the burn.

Approximately 600 marten carcasses were purchased from T. Coyle (McGrath, Alaska) for food habits analysis of marten adjacent to the burn. Contents of intestinal tracts were removed and frozen, then a sample of 265 were selected for analysis. All intestinal tracts which appeared to have at least a small amount of food material were selected (76 in 1984, 79 in 1985, and 100 in 1986). The samples were sent to the Composition and Analysis Lab at Colorado State University. Identification of species was primarily through hair scale patterns.

Small mammal traplines were run in early August 1984 through 1986. In 1984, 2 parallel 250-m transects were established in burned and unburned white spruce stands and trapping stations every 10 m were set with 2 small snaptraps and 1 Museum Special snaptrap. In 1985, trapping was expanded to include burned and unburned black spruce (Picea mariana) as well as burned and unburned white spruce (different stands than those trapped in 1984). One 500-m transect was established in each of the 4 habitats with stations every 10 m. Two small snaptraps, 1 Museum Special snaptrap, and a pitfall trap were placed at each station. In 1986, trapping was continued in the burned and unburned white spruce. For each type, 2 300-m transects, each in separate stands different from 1984 and 1985, were established with stations every 20 m. In addition, 2,000-m transects were established in the mosaic of vegetation types away from the rivers (one in burned and one in unburned habitat) with trapping stations at 20-m intervals. Two small snap traps, 1 Museum Special snaptrap, and 1 pitfall trap were placed at each station in 1986. Peanut butter and rolled oats were used as bait in all years. At each trapping station, plant species composition was noted.

Berry sampling was conducted from 30 July to 3 August 1985 to compare berry production in burned and unburned habitats. Pre- and postburn sites were chosen in mixed conifer/deciduous forest, open (25-60% cover) conifer forest/wet meadow, and black spruce. In addition, sampling was conducted in burned white spruce forest and unburned wet meadow because of the prevalence of these types in the study area. The locations of the major habitat types sampled were chosen based on observations during travel throughout the study area and from examination of aerial photographs. Before beginning the field work, 10 randomly chosen points were selected from a grid representing an area 30 m x 30 m and containing 900 1-m^2 plots. At the sampling site, an imaginary grid was aligned in a north/south direction at a randomly chosen starting point. Each of the 10 1-m^2 plots were then located with a compass and a measuring tape with the southwest corner of each plot corresponding to a point on the

original grid. A wooden frame 1 m x 1 m was placed at each sampling location. Within the frame, the composition and percentage cover of overstory, shrub, and ground level species as well as amount of deadfall and litter were recorded. All berries were picked and counted to develop an index of abundance.

RESULTS

Vegetation

Three preburn vegetation categories were identified in the study area:

1. Closed conifer or mixed forest along rivers and creeks
2. Closed deciduous forest on ridges
3. Mosaic of forest, woodland, bog, and meadow in the remaining areas.

Only 1 plot (plot 19-25) fell within category 2. The fire had destroyed all vegetation at this site which was typical for vegetation on ridges within the study area. The remainder of the vegetation plots were randomly distributed within categories 1 and 3. The locations of the vegetation plots are presented in Figs. 2 and 3.

The unburned closed forest along rivers and creeks was composed primarily of white spruce, paper birch, and aspen with some black spruce. Density of live trees averaged 920 trees/ha with an average diameter of 19 cm. The understory included mosses, alder (Alnus spp.), horsetail (Equisetum spp.), wild rose (Rosa acicularis), and twinflower (Linnaea borealis; to a lesser extent, dwarf dogwood (Cornus canadensis), willows (Salix spp.), particularly along stream edges, bog cranberry (Oxycoccus microcarpus), grass (Calamagrostis canadensis) (particularly along stream edges), and highbush cranberry (Viburnum edule). Log debris occurred on 31% of the plot quadrats. The average maximum height of the logs was 24 cm above

ground and the average maximum diameter was 9 cm. The vegetation in the unburned closed forest is summarized in Table 1. See the following plots (Appendix A) for a detailed description: 6-37, 10-34, 11-35, 11-39, 11-42, 12-34, 19-38, and 19-40.

The vegetation sampling was carried out in August 1984, 7 years after the fire. By this time, herbaceous growth was well-established in the burn. In the burned closed forest, seedlings of paper birch had reached heights of 1-2 m in some areas. The seedlings averaged 16% cover on the plots with an average count of 32 stems per plot. The dominant postburn vegetation was mosses, fireweed (Epilobium angustifolium), and liverwort (Marchantia polymorpha). Horsetail and grass occurred to a limited extent. Other herbaceous growth was minimal. Log debris (mainly wind-thrown trees) occurred on 67% of the quadrats. Logs had an average maximum height above ground of 60 cm and an average maximum diameter of 15 cm on the plots. There was little standing water in either the unburned or burned closed forest. A summarization of the vegetation in the burned closed forest is presented in Table 2. See the following plots (Appendix A) for detailed descriptions of the burned closed forest: 1-26, 6-47, 7-24, 8-25, 20-23, and 20-25.

The unburned mosaic (category 3) was highly variable in canopy and understory composition and in moisture conditions. There were some stands of dense black spruce with a moss and ericaceous shrub understory. Open black spruce forest occurred to a limited extent. Most areas were covered by black spruce and/or tamarack (Larix laricina) woodland and sedge (Carex spp.) or shrub meadows and bogs. Ground cover was primarily sedge, dwarf birch (Betula nana), grass, marsh fivefinger (Potentilla palustris), and horsetail; to a lesser extent, willow, leatherleaf (Chamaedaphne calyculata), bog rosemary (Andromeda polifolia), labrador tea (Ledum palustre), and alder. There was no log debris on the plots in the unburned mosaic. Standing water was common (15% cover; 92% occurrence) and some of the wettest sites had floating mat vegetation. A summary of the unburned vegetation mosaic is presented in Table 3. The

following plots in Appendix A provide a detailed description of the unburned mosaic: 10-41, 10-42, 10-49, 10-52, 11-43, 11-45, 11-53, 12-35, 12-36, 12-42, 12-48, and 12-51.

Differences between pre- and postburn vegetation in category 3 were not as dramatic as differences in pre- and postburn closed forest. Sedge, grass, and horsetail were still the most commonly occurring herbaceous species after the fire, though the percentage cover of sedge was somewhat lower and of grass and horsetail somewhat higher postburn. Characteristically, seedlings of paper birch were more common postburn. Log debris increased after the fire, with logs occurring on 19% of the quadrats at Sampling Site #1 and on 50% of the quadrats of Sampling Site #2. The fire did not appear to affect the amount of standing water. Spring flooding and rainfall had a much greater effect on the amount of standing water. Results of the vegetation sampling in the burned mosaic category are presented in Table 4. For detailed descriptions of vegetation plots, see the following plots in Appendix A: 3-23, 3-24, 3-27, 6-24, 6-28, 6-32, 6-33, 10-25, 10-27, 10-28, 11-24, 12-23, 12-30, 16-27, 17-20, 17-21, 17-22, 17-28, 17-32, 17-34, 17-47, 19-23, 19-25, 19-29, 19-32, 19-50, 19-51 (Sampling Site #1), and 2-22, 2-23, 2-27, 4-22, 7-23, 7-28, 8-22, 8-28, 9-22, 14-25, 18-24 (Sampling Site #2).

Radio-tracking

Seventeen marten (11 males, 6 females) were captured, 16 of which were outfitted with radio transmitters (Table 5). Three of these died during surgery or shortly after their release. Two others died in the study area from unknown causes 2-3 weeks after their release. Two disappeared (radio signal lost) from the study area less than 10 days after their release, one of which was later taken by a trapper outside the study area (see p. 17). Nine of the radioed animals were tracked in the study area from 1 to 7 months after their release. One of these was recaptured near the original capture site a year after its initial capture. Minimum home

range size and number of locations for each marten are presented in Table 6.

Ten marten were captured within the boundaries of the Bear Creek burn, 2 were captured in the partially burned area, and 5 were captured outside the burn. At least a portion of the ranges of all the radioed marten fell within the burn or partial burn (Figs. 4-7). The 3 marten that died during or shortly after surgery were all captured near the mouth of Sullivan Creek well within the burn.

The radioed marten traveled, hunted, and rested within the burn. Of 134 locations of radioed marten made from the air, 44% were in burned timber and 14% were in a mixture of burned and unburned trees or at the edge of a burned stand. Additional locations that were made within the burn were in live trees (inclusions). No more than 54% of a radioed marten's locations occurred outside the burn (Table 7).

The number of times a marten was located in live trees depended on the availability of live trees in its range. For example, despite the fact that 62% of M5's calculated range was within the burn (Fig. 4), only 30% of his 23 locations were in burned trees. Most of his locations in live trees were outside the burn, but 38% were in inclusions within the burn. Live trees occurred on 53% of the plots in the burned portion of M5's range; 46% of M5's locations in the burn were in live trees. In comparison, 100% of M3's range was in the burn (Fig. 5) and 92% of his locations were in burned trees. The area where M3 ranged was almost entirely burned; live trees were found on only 15% of the vegetation plots. The density of live trees on the plots in M3's range was only 10-21 trees/ha; in M5's range, live trees occurred at a density of 10 to 1,397 trees/ha on the plots. The average density of live trees in M3's range was less than 10 trees/ha, but in M5's range, the average density of live trees in the burned portion was 78 trees/ha and in the unburned portion, 393 trees/ha.

Without the protection of an overhead canopy of trees, M3 relied on windthrown trees, herbaceous vegetation, and snow tunnels for cover. In his range, windthrown trees (or log debris) occurred on 79% of the vegetation plots and on 65% of the quadrats on these plots. The average maximum height of the logs on the quadrats was 40 cm and the average maximum diameter was 12 cm. The density and diameter of log debris was higher along the Pitka Fork where stands of white spruce had been burned. In these riparian white spruce stands, log debris occurred on 100% of the plots and on 80% of the quadrats. The average height and diameter of the logs on the plots were 62 cm and 15 cm, respectively.

The average percentage cover of herbaceous vegetation on the plots was not as high in the burned white spruce (38%) as it was in the vegetation mosaic away from the river (62%). However, the height and structure of the herbaceous vegetation was quite different between the 2 areas. Most of the herbaceous vegetation in the burned riparian spruce was fireweed with an average height of approximately 1 m. Sedges, grasses, and horsetail with an average height of less than 0.5 m were the most common herbaceous species away from the river. The height and leafy structure of fireweed and the additional cover provided by log debris along the Pitka River may actually provide better cover for marten than the denser herbaceous vegetation that occurred away from the river.

Subnivean spaces used by marten in winter were larger and occurred in higher numbers in the burned riparian spruce stands than in the remainder of M3's range. Access to these spaces also was greater along the river because of the large root systems of windthrown white spruce that protrude above snow even in very deep snow. All of M3's winter radio locations were in or near large amounts of windthrown timber, mostly along the river; however, M3 did use other portions of his range during winter, as was evident from snowtracking him on the ground. The only areas that were regularly avoided in winter were large open windy areas such as lakes and meadows that had a hard snowpack with little vegetation or log debris protruding above the snow.

Even in summer, most of M3's locations were near the river. About 62% of his summer locations (May-Sep) were in windthrown white spruce. Only 42% of the randomly selected vegetation plots were in burned white spruce, suggesting that M3 selected the riparian spruce stands disproportionately to their occurrence in his range. In addition, the establishment of the elongated shape of M3's range (Fig. 5), with the river running lengthwise through its center, is a strategy that tends to maximize the amount of riparian white spruce in M3's range. Other marten captured along the same length of the Pitka Fork (M12, F4, F7) also had ranges that appeared elongate and centered on the river (Fig. 5).

The Pitka Fork in the study area is a deep, slow-moving river less than 50 m wide in most places and presents no barrier to marten movements. Marten regularly swam across the river, sometimes more than once in a single day.

M3 apparently remained in his range (3.47 km^2) for at least a year. He was first captured on 9 April 1984, radio-tracked until 16 October 1984, and recaptured in the same area on 3 March 1985. He subsequently died within 6 days after surgery to replace his transmitter.

Marten not only lived in the burn, but dispersed through the burn as well. F7 was captured on 3 March 1985 and located 17 times in the burn in an area of 0.53 km^2 before 1 May 1985. During this time, she made frequent use of an active squirrel midden in a small unburned stand of white spruce. Though burned white spruce stands with high densities of windthrown trees were nearby, she appeared to prefer the squirrel midden as a rest site. The next nearest stand of live trees was several hundred meters away. On 15 May, she was located 7 km south of her previous range; she was in the burn between the Pitka Fork and the Middle Fork of the Kuskokwim River. On 2 June 1985, F7 was found dead along the Middle Fork about 15 km northwest of her last location. She had been recently killed (less than 5 days) by a mammalian predator. The evidence suggests she had been dispersing through the burn during or shortly before the

time she was killed. The intact carcass was found in a stand of live white spruce adjacent to the burn. The chest was crushed and large puncture wounds were evident on the upper half of the body.

Another marten, M12, was captured on 3 April 1985 and was located twice more by 12 April in an area of 1.17 km^2 when his radio signal disappeared. He was subsequently captured by a trapper on the Nixon Fork of the Kuskokwim River on 16 December 1985, approximately 60 km northwest of his previous location. He would have had to disperse through the burn to reach this last location.

F4 may have been another marten that was dispersing through or from the burn at the time of her capture. She was radio-tagged on 14 April 1984 and released at her capture site along the Pitka Fork. Five locations of her in burned timber were made in an area of 0.82 km^2 (Fig. 5) before her signal disappeared on 23 April 1984. She was not located again and is the only marten whose signal failure remains unexplained. Because transmitter reception was usually less than 3 km from the tracking aircraft, F4 could have dispersed from the burn; there was no concerted effort to search for her outside the burn.

Other marten that could have been residents entirely within the burn or dispersers at the time of their capture were M14, M16, and M18, the marten that died during or shortly after surgery. M18, caught in August 1985, was known to be a juvenile male by the presence of deciduous canines beside the permanent teeth. M18 was possibly born within the Bear Creek burn, but no adult female was captured in that area.

Eleven of the 16 radio-tagged marten died during the study. Dead marten were usually not located soon enough after death to verify the cause of death. Only F7 was known to have died from predation and M3 from the surgery procedure. However, if a marten died within 3 weeks after surgery, the probable cause of death was assumed to be complications of surgery. After 3 weeks, predation was assumed to be the cause of death (Table 5). Three marten were taken by trappers, none within the burn.

Food Availability

Over the duration of the study, 10 species of microtine rodents and insectivores totaling 403 individuals were captured in the study area (Appendix B). The masked shrew (Sorex cinereus) was, by far, the most common species captured both inside and outside the burn. The 2 most commonly captured microtine rodents were the red-backed vole (Clethrionomys rutilus) and the yellow-cheeked vole (Microtus xanthognathus). The bog lemming (Synaptomys borealis) ranked a low fourth place among the species trapped. The red-backed vole was most commonly caught outside the burn; the Microtus species (yellow-cheeked vole; meadow vole, M. pennsylvanicus; tundra vole, M. oeconomus) and the bog lemming were more common within the burn (Table 8).

The results of the analysis of the intestinal tract contents from marten trapped outside the burn were markedly different from the above results (Table 8). The 5 most common species identified (red-backed vole, yellow-cheeked vole, meadow vole, bog lemming, and masked shrew) were equally represented in the sample.

A significant (Chi-square, $P < 0.001$) increase in the number of shrews caught in the study area occurred in 1986 compared to 1985 (Table 9). For example, over 16 times more shrews were caught per 100 trap nights in burned white spruce in 1986 than in 1985. The increase resulted from an apparent increase in the masked shrew population. From 1985 to 1986 the masked shrew increased from 87% to 97% of the shrews captured and the pygmy shrew (Sorex hoyi) decreased proportionally. The increase in shrews occurred in all habitats sampled but was greatest in the burned white spruce stands.

The relative abundance of microtine rodents based on trapping success varied with habitat type (Table 9). Overall, trapping success was greatest in the burned and unburned white spruce stands. Burned and

unburned black spruce stands produced more captures per 100 trap nights than the burned or unburned mosaic vegetation that was sampled.

Species composition varied between the different habitats sampled, but certain patterns emerged (Table 10). Species diversity was usually greater in the burned habitats. The proportion of red-backed voles decreased in burned habitats, though this vole was still commonly caught in the burn. Yellow-cheeked voles were proportionally higher in burned white and black spruce than in unburned examples of these habitats with the exception of 1984 (see p. 24). Distribution of yellow-cheeked voles in these burned habitats was generally uniform. The burned vegetation mosaic sampled in 1986 was the only burned habitat which did not have yellow-cheeked voles. Most of the yellow-cheeked voles captured in the unburned mosaic were restricted to a small area between the riparian white spruce forest and a large tamarack/shrub meadow suggesting that the trapping transect intersected an isolated colony of the voles. The meadow vole, the tundra vole, and the bog lemming reached moderate numbers only in the burned black spruce and burned mosaic. Of all the microtine rodents captured, 73% of the red-backed voles were caught in unburned habitats, but 58% of the yellow-cheeked voles and 86% of the remaining species were caught in burned habitats.

An apparent decline in microtine populations within the burn appeared to be confined to the vegetation mosaic away from rivers. In 1985, 2.8 microtines/100 trap nights were captured in burned black spruce (a part of the vegetation mosaic); only 1.3 microtines/100 trap nights were caught in similar black spruce stands in 1986. This difference was significant (Chi-square, $P < 0.05$). The yellow-cheeked vole comprised 29% of the catch in 1985, but none were caught in 1986. The bog lemming comprised 47% in 1985, but only 11% in 1986. Although the trapping sites were not identical in vegetation composition and microhabitat, the very noticeable reduction in microtine sign (burrows, runways, diggings, droppings, and vocalization) that occurred throughout the vegetation mosaic in 1986 from what was observed during the previous 2 years is

further evidence that a decline occurred. A similar decline in the microtine population in the burned white spruce did not occur and, in fact, microtine abundance apparently increased in this habitat type due to an increase in both yellow-cheeked voles and red-backed voles.

Within unburned habitats in 1985, 8 species of berry-producing plants were observed; in the burned habitat, there were 6 species (Table 11). The unburned areas generally had higher values for percentage cover and number of berries per plot. Blueberry (Vaccinium uliginosum) was the most common species in unburned habitats; cloudberry (Rubus chamaemorus) was most common in burned areas.

There was some evidence for changes in berry composition as a result of burning for species which were common to either or both habitats. For example, the unburned open conifer/wet meadow type had a mean percentage cover per plot for blueberry of 27.5; the mean percentage cover for blueberry in burned open conifer/wet meadow was only 3.3. Lower percentage cover values in burned habitat also occurred for blueberry in black spruce and for lowbush cranberry (Vaccinium vitis-idaea) and rose in mixed wood. Only cloudberry had a higher value for percentage cover in burned habitats.

Berry production appeared to be quite low throughout the study area during 1985. Most (85%) of the 1-m^2 plots that had berry species had less than 10 berries per plot. The vegetation type which had the highest production was unburned open conifer/wet meadow with an average of 85 blueberries per plot. Blueberries were also relatively abundant on unburned black spruce plots (17 berries per plot). None of the burned plots contained many blueberries. Lowbush cranberry was the most abundant species on burned plots (13 berries per plot in black spruce), but production of lowbush cranberry was even higher on unburned plots (20 berries per plot in black spruce).

Though berry sampling was not conducted in 1986, observations made during small mammal trapping in August suggested that the production of blueberries in burned black spruce was much higher in 1986 in areas where the preburn vegetation had been black spruce forest with an understory of ericaceous shrubs, including blueberry.

DISCUSSION

Habitat Use

The movements and behavior of radio-tagged marten in this study indicate that marten can maintain home ranges that are entirely within the perimeter of a burn. A number of studies report that marten are attracted to the edges of burns and other forest openings (Simon 1980, Spencer et al. 1983, Stephenson 1984); observations of marten using burn interiors are infrequent. Most of the trappers who responded to Stephenson's (1984) questionnaire on marten use of burns in Alaska reported marten along the edges of burns and in unburned inclusions; however, several trappers found marten abundant in the interior of burns, including burns as large as 212,500 ha. Golden (1986) reported that marten tracks observed during survey flights in the Yukon Flats National Wildlife Refuge were particularly abundant in the 89,069 ha Lone Mountain burn of 1979. According to Golden (pers. commun.), the tracks occurred throughout the burn and were not necessarily associated with inclusions. Though marten use of the entire Bear Creek burn was not evaluated, marten tracks were noted during winter flights well within the burn. Residents of Nikolai reported that fresh marten sign could usually be found in the Bear Creek burn along Sullivan Creek where the creek intersects the Iditarod Trail, the only winter trail through the burn. Ground access through burns is often restricted by the amount of windthrown trees, which may, in part, explain the lack of information on marten in burn interiors.

Apparently, a forest canopy of live trees is not a prerequisite of marten habitat in the Bear Creek burn. The average density of live trees in M3's range was calculated at 10 trees/ha. The actual density of live trees was even less than the calculated value because 33.3 m was used as the maximum distance to the nearest live tree in the density equation even if no tree occurred within this distance (Foote 1983). Distance to the nearest live tree was often much greater than 33.3 m. To our knowledge, no other marten study has documented marten home ranges in areas with essentially no available forest canopy.

The numerous reports of marten avoiding open areas (Lensink 1953, Hawley and Newby 1957, Koehler et al. 1975, Simon 1980, Hargis 1981, Spencer et al. 1983, Wynne 1981) suggest that overhead cover is a critical element of marten habitat. Hargis (1981) demonstrated that marten preferred overhead cover that was less than 3 m above the snow. In the Bear Creek burn, it appeared that log debris, principally in the form of windthrown trees, provided sufficient cover for marten. Marten radio-tracked to resting sites within the burn during summer were frequently found in dense tangles of windthrown trees. During winter, the interlacing log debris intercepted snow and formed a network of runways sheltered by the snow canopy. Log debris was most dense in areas along drainage lines or on ridges. The large diameter white spruce trees that died in the fire toppled over relatively quickly in the windy study area, but small diameter black spruce remained largely upright even 10 years after the fire. Marten tracks were more abundant in the white spruce than in the black spruce, and from tracking marten in snow we concluded that availability of and access to subnivean spaces were greater in the white spruce and on the ridges than in black spruce or open meadows, though hunting, traveling, and burrowing were observed in all of these habitats.

Cover for marten in burns might not be adequate in years when snowfall is light or in areas where average snowfall is minimal or the ground is blown free of snow. Buskirk (1984) suggested that red squirrel

(Tamiascuris hudsonicus) middens provide important microclimatic protection for marten and that the lack of middens could limit the distribution and abundance of marten during the coldest periods of the year. We believe that squirrel middens, though possibly preferred for rest sites, are not a prerequisite for marten winter habitat provided subnivean space is available. Of 32 marten rest sites described by Vernam (M.S. Thesis in preparation, University of Alaska, Fairbanks), 38% were active squirrel middens and 34% were subnivean spaces. The insulating qualities of snow was apparently sufficient to provide the "thermoregulatory advantage" that Buskirk (1984) considered important. During the time marten were tracked in the Bear Creek burn, snow was often over a meter deep and subnivean spaces provided by windthrown trees were large and extensive. The structure provided by the windthrows also influenced snow density which determines burrowing efficiency for marten. Snow was least dense in thick stands of birch regrowth and secondly in areas of dense windthrow. The snow in the stands of dead black spruce was more densely packed but still provided burrowing opportunities for marten. The snowpack was most dense in large open meadows unprotected from wind; marten appeared to use these areas the least.

Many other studies have recognized the importance of log debris in marten habitat. Hargis (1981) found that logs provided winter den sites and were important as hunting areas and subnivean travel routes. She observed 9 instances where marten traveled under the snowpack in association with logs. She also noted marten digging down over 50 cm to reach logs buried by snow and suggested that marten remember the location of snow-covered logs. Hargis (1981) also suggested that marten use logs protruding above the snow for access to the subnivean zone and, thereby, decrease the energetic costs of digging through snow to reach subnivean spaces. Other researchers have also documented the importance of logs for access to subnivean spaces as runways or hunting sites and as dens or rest sites (Marshall 1951, Francis and Stephenson 1972, Simon 1980, Frederickson 1981, Steventon and Major 1982, Spencer and Zielinski 1983, Slough and Smits 1985).

Logs are one of the features of marten habitat that are used to measure habitat suitability. Patton and Escano (1983) considered 3-20 inch down woody material at approximately 8-45 metric tons/ha as the most desirable loading for marten habitat to meet food requirements and greater than 20-inch diameter logs to meet denning requirements. Allen (1984) considered downfall covering 20-50% of the ground surface as having the optimal value for marten habitat suitability; however, Allen did not feel that either the absence or the high density of downfall severely limited the cover value for marten.

Marten appear to be flexible in their selection of den sites. Dens have been reported under logs (Francis and Stephenson 1972, Hargis 1981, Wynne 1981), in mature trees (Wynne 1981), in boulders and rock piles (Remington 1952, Francis and Stephenson 1972), and in buildings (Murie 1961, Hargis 1981). Although no dens were located within the Bear Creek burn, enough downfall and inclusions occurred in the burn that denning habitat was undoubtedly available. One juvenile marten was captured approximately 10 km inside the burn in mid-August; this young male could have been born within the burn. Wynne (1981) trapped a marten kit within its mother's home range during August even though marten kits appeared to be independent of the mother by then. Simon (1980) reported seeing a young male marten with its mother in late August. However, dispersal of young marten possibly occurs as early as July and August (Francis and Stephenson 1972, Archibald and Jessup 1984), which suggests that the juvenile marten captured in the burn may not have been a resident.

Predation

Though the sample size is small and the evidence circumstantial, the data suggest that natural mortality may be higher for marten living in the Bear Creek burn than for marten with at least part of their home range in unburned habitat. All marten that died of unknown causes (M1, M3, M8, M10, M14, M18) ranged within the burn; none of their locations were outside the burn. Of the 6 marten that were still alive when their

transmitters failed (M2, M3, M5, M6, F9, F15), 5 had unburned habitat within their range. M3 was the only marten that lived entirely within the burn and was still alive when his transmitter failed after approximately 6 months; he was still alive in the burn a year after his initial capture.

If the cause of death for the 6 marten that died in the burn was not surgery-related, then the most likely cause of death was predation or possibly intraspecific aggression. Food was not a limiting factor for marten in the study area. One case of predation by a mammalian predator was verified (p. 16); the death of this marten was caused by a mammalian predator larger than a fox. Potential mammalian predators in the burn include red fox (Vulpes vulpes), wolverine (Gulo gulo), coyote (Canis latrans), wolf (Canis lupus), and black bear (Ursus americanus). These species as well as lynx (Lynx canadensis) occur in the adjacent unburned habitat.

Avian predators may be important predators of marten in the Bear Creek burn. Herman and Fuller (1974) presented evidence that marten will seek cover from avian predators. Trappers in the 1930's listed golden eagles (Aquila chrysaetos) and great-horned owls (Bubo virginianus) as the principal predators of marten in California (Grinnell et al. 1937 as cited by Hargis 1981). Great-horned owls were commonly seen along the perimeter of the Bear Creek burn and were probably present in the larger unburned inclusions as well. Great grey owls (Strix nebulosa) and red-tailed hawks (Buteo jamaicensi) were common in the burn but I know of no documentation of their preying on marten.

Additional research will be necessary to determine if predation on marten is higher in burns than in adjacent unburned forest. The number of potential marten predators that are present in a burn may determine, in part, the degree to which the burn is exploited by marten. Windthrown trees might provide protection from avian predators but be ineffectual against terrestrial predators. The size and complexity of predator

communities from one area to another within the range of the marten might be partly responsible for the variety of research results regarding the use of forest openings by marten.

A high predation rate, if it does occur in the Bear Creek burn, may be offset by a low rate of kill by trappers. None of the radio-tagged marten were trapped in the burn. Two marten moved out of the burn and were subsequently taken by trappers. A third marten was trapped within the unburned portion of its range. Trapping occurred infrequently in the burn because access to most areas of the burn was hindered by windthrown trees unless snow depth approached 1.5 m and was dense enough to support snow machines. Snowfall was often light until late winter and strong winds often blew the area free of snow.

Food Availability

The abundance and species composition of microtine rodents in the study area varied greatly with habitat type and trapping year; nevertheless, it is clear that the Bear Creek burn, at least at the northern end where this study was conducted, supported microtines at levels equaling or surpassing those of adjacent unburned areas. Overall trapping success was higher in unburned than in burned habitats (4.8 vs. 3.6 microtines per 100 trap nights, respectively), but the very high capture rate (15.3 captures per 100 trap nights) in 1984 in unburned white spruce greatly influenced overall trapping success. In 1985 and 1986, trapping success was generally higher in the burned habitats.

Trapping results in 1984 (Table 9) were probably influenced by the juxtaposition of burned and unburned habitats at the trapping sites. The trapline in burned white spruce was located in an inside bend of the Pitka Fork near vegetation plot 19-43 (Fig. 2), and the trapline in unburned white spruce was in the same area near vegetation plot 6-37 (Fig. 2). The burned white spruce stand was surrounded by water and an unburned white spruce stand and was adjacent to a meadow. The close

proximity of unburned forest and meadow habitat may have been responsible for the relatively high proportion of red-backed voles and the presence of meadow voles in the trapped sample. Similarly, the unburned stand of white spruce where the second trapline was located was bordered on both sides by burned habitat which may have accounted for the high proportion of yellow-cheeked voles captured on the trapline. In addition, the isolated nature of this stand may have been responsible for the dense population of red-backed voles, though a generally high population of red-backed voles in 1984 could have occurred. The traplines in 1985 and 1986 were located in separate areas so that juxtaposition of burned and unburned habitats could not influence the results of the trapping effort.

Not only were microtine populations higher within some areas of the burn than in comparable areas outside the burn, but also microtine biomass was probably higher in the burn than outside the burn. Of the microtines caught outside the burn, 79% were red-backed voles. Within the burn, 62% of the trapped microtines were either Microtus species or bog lemmings, all species with average body weights greater than the red-backed vole. It was not uncommon to capture yellow-cheeked voles (33% of all species caught in burned habitats) that weighed well over 100 gm a piece.

The high proportion of Microtus in the burn may have made the burn particularly attractive to marten. The results of food habits analysis for marten outside the burn (Table 8) seem to support the contention that marten prefer Microtus species over red-backed voles (Buskirk and MacDonald 1984). The relative abundance of red-backed voles in the diet of marten outside the burn was significantly lower than the relative abundance of red-backed voles taken in the small mammal traplines outside the burn. Marten intestinal tracts contained nearly equal proportions of red-backed voles, yellow-cheeked voles, and meadow voles. The bog lemming was also equally represented, but its relative availability may have been underestimated due to the apparent trap-shy nature of the species (Buskirk and MacDonald 1984).

The results of the small mammal trapping in this study supported the findings of West (1979) in a study of microtine responses to forest succession in interior Alaska. In his study, the Microtus species were most abundant in recently burned sites and in some birch stands where ground-level vegetation was similar to recently burned sites, though the yellow-cheeked vole was restricted to recently burned sites. West considered substantial quantities of grass-dominated vegetation the most important factor determining suitability of habitat for Microtus. However, Wolff and Lidicker (1981) found that winter food caches of yellow-cheeked voles contained horsetail and fireweed rhizomes, which helps to explain the apparent preference of yellow-cheeked voles for burned white spruce stands where fireweed was most abundant.

In contrast to the yellow-cheeked vole, the red-backed vole was distributed uniformly over all the habitats West (1979) sampled. This vole had much broader dietary components than Microtus and, therefore, could exploit a variety of habitat types.

West (1979) captured the bog lemming on recently burned sites and in wet black spruce forest. He suggested that the preferred habitat of the bog lemming, for which little is known in interior Alaska, may be floodplain and other areas of low elevation with permanent water. Therefore, unlike Microtus which can be expected to invade most areas in interior Alaska that are altered by wildfire, bog lemmings are likely to recolonize only low-lying areas.

In a large burn such as the Bear Creek burn, recolonization of the area by all microtine species present before the fire is likely due to the tendency of fires to pass over depressions or skip streams and small rivers, leaving remnants of the preburn vegetation and the associated small mammal populations as founder populations. In areas with small fires or intense fires that burn completely, proximity to extant Microtus populations is probably an important determinant of microtine diversity and abundance postburn, at least in the early years after a fire. The

red-backed vole, on the other hand, because of its ubiquitous distribution over much of interior Alaska, has immediate access to most burns. Therefore, the complex of microtines reinhabiting burns in interior Alaska are most likely to include red-backed voles and a complex of other microtine species depending on the size and intensity of the fire and the proximity of the various microtine species.

One of the more interesting results from West's (1979) study of habitat responses of microtine rodents was that red-backed vole abundance was similar across all forest types within a given year and that pronounced differences in abundance was seen between years. He concluded that any explanation of the variation in abundance must be a general one because it influenced the populations in all forest types. In sharp contrast, the remaining microtines in his study (tundra vole, meadow vole, yellow-cheeked vole, brown lemming [L. sibiricus], and bog lemming) did not show large changes in abundance between years. These findings suggest an important function which recent burns might serve in the maintenance of marten populations. In years when red-backed voles undergo widespread reductions in abundance, marten might rely heavily on other microtine rodents in recent burns as a buffer until red-backed vole populations have recovered. This dependence is most likely to occur in late winter and early spring when seasonal abundance of microtine rodents in general is low and might account, in part, for the unusually high amount of marten sign observed in some burns (Stephenson 1984).

Evidence from this study suggests that yearly fluctuations in microtine abundance within a burn can occur, particularly between habitat types for some species. If West's (1979) observations of red-backed voles are applicable to other areas of interior Alaska, then red-backed vole populations within a burn can be expected to fluctuate in concert with fluctuations outside the burn, as they appeared to do in this study (Table 10). At the same time, other members of the microtine community within the burn might remain stable or even increase assuring a dependable food source for marten in the burn despite reductions in adjacent habitat types.

Rapid succession limits the length of time for favorable population growth of Microtus in recent burns. Most recent burns can maintain low populations over extended periods, but only a small number of burns are at the stage where peak densities can be produced. Lightly burned areas where the mature forest ground cover survived might never develop a dense herbaceous layer favorable to population growth. For this reason, peak populations of Microtus are probably not common in interior Alaska and occur asynchronously (West 1979). Thus, dense marten populations that might be associated with maximum microtine abundance are necessarily temporary in nature and asynchronous in time, but could be important sources of dispersers that will repopulate areas decimated by food shortages or heavy harvest pressure.

Berry production varies widely on a seasonal and annual basis and this variation is often reflected in the marten's diet (Buskirk and MacDonald 1984). A cool, wet spring and widespread flooding in low-lying areas of the Bear Creek burn in 1985 probably contributed to low productivity of berries that year; dry, warm spring weather in 1986 apparently had the opposite effect. Berry production in 1984 appeared to be somewhere between that of 1985 and 1986. In good berry-producing years, burned habitats, at least burned black spruce, appeared to be much more productive than unburned habitat. However, in 2 out of 3 years during the study, berry production in unburned habitats was equal to or higher than that in burned habitats. In the long-term, overall berry production may be similar between the 2 habitats, being consistently at more or less moderate levels in unburned habitats and at generally lower though periodically abundant levels in burned habitat. The effect of berry production on marten distribution and abundance is not known, but it is unlikely that berries are a critical item in the marten's diet except in years when small mammals are scarce. Berry consumption by marten is highest in the fall (Buskirk and MacDonald 1984) at a time when small mammals are generally at a peak. An indirect effect of berry production on the marten's diet might be the influence of berry abundance on small mammal populations, particularly the red-backed vole. Because this

species consumes fruit to a much greater degree than the Microtus species (West 1979), an abundance of berries in a burn may contribute to an increase in the number of red-backed voles. West (1979) found that the red-backed voles consumed berries almost exclusively in the fall and berries constituted the primary food source through the winter.

Results of this study are probably directly applicable over large areas of interior Alaska where black spruce forests, intermingled with open meadows and bogs, occur in low-lying areas and closed conifer or mixed wood forests border streams and rivers. Different results can be expected in upland areas which have drier, more uniform forest types. However, the food and cover requirements of marten (i.e., good microtine populations available year-round and protection from predators and cold temperatures) are provided by many plant communities and seral stages. Extensive stands of paper birch or aspen (the postfire hardwood stage characterized by Foote 1983) are probably the least likely of the common plant communities in interior Alaska to support marten populations. Cover for marten is poor in these forest types and West (1979) reported that Microtus are generally uncommon in these stands. Lensink (1953) stated that marten abandon areas where aspen and birch are the dominant tree species. Mech and Rogers (1977) suggested that the large scale replacement of coniferous forests by aspen and birch forests in Minnesota during the late 1800's was largely responsible for the decline of marten in that state. Protection from fire since the early 1900's in Minnesota has led to the improvement of marten habitat with the gradual increase of coniferous species in the aging deciduous forests. Large blocks of relatively pure stands of aspen and birch forests in interior Alaska are largely limited to upland areas on southfacing slopes and east or west-facing slopes, respectively. Wildfire occurs most frequently in black spruce forest types in interior Alaska and direct replacement by another stand of similar species is the most common occurrence after fire; the invasion of black spruce burns by aspen and birch is more common in the southern boreal forest than it is in the north (Viereck 1983). This

tendency for taiga in interior Alaska to maintain its coniferous component guarantees that marten habitat will remain intact under the present fire management plan for interior Alaska (Tanana/Minchumina Fire Planning Team 1982) and marten populations will continue to thrive, with local shifts in abundance occurring in response to the dynamic nature of forest succession.

CONCLUSIONS AND MANAGEMENT CONSIDERATIONS

The marten is very flexible in its selection of habitat types and, therefore, should not be depicted as a climax species in interior Alaska as it has in other areas (Koehler et al. 1975). This study and others cited above have demonstrated that marten are attracted to early successional habitat types and that, in fact, open areas such as bogs, meadows, grassy sloughs, and burns are probably important components of good marten habitat. Wildfire is the primary means by which open habitat is created in interior Alaska, flooding and logging being less important. Wildfire occurs at periodic intervals and is unpredictable in extent and location. The herbaceous stage that develops after fire is relatively short-lived. Marten habitat evaluation, therefore, must take into consideration the dynamic nature of habitat quality and availability. Management plans should include a review of the fire history and fire weather zone (Trigg 1971, Gabriel and Tande 1983) of the area. Suitability of an area as marten habitat should be evaluated not only for its current status but also for its long-term potential. Managers must recognize that some stages of succession will be less desirable as marten habitat than others, but marten productivity in the long run may be higher in a mosaic of seral types than in climax forest over the same period of time. Management should be aimed at maintaining the fire-driven ecosystem of interior Alaska to which marten have adapted.

Marten habitat suitability models that were developed for marten in the northwestern United States are not applicable in their entirety to marten

in interior Alaska. This study has shown that marten do not necessarily require an overhead canopy of trees as long as protection from weather and predators is available. Managers interested in the potential of a burn to provide marten habitat must consider the cover characteristics that will be provided by deadfall and windthrown trees. The optimum amount and size of downed trees and the length of time the deadfall can be expected to provide cover should be evaluated. The transition period between the use of deadfall as cover and the use of coniferous species as they reach sapling size should be identified. These facts will be useful in estimating the duration of the burn as marten habitat.

Two forest successional stages resulting from wildfire in interior Alaska are probably poor marten habitat for several decades. Nearly pure stands of deciduous trees in the hardwood stage of postfire succession (Foote 1983) apparently provide insufficient cover for marten and do not generally support abundant microtine populations. Foote (1983) estimated this stage occurs 46-150 years after a fire. As the understory of coniferous species matures, however, this stage will become favorable as marten habitat. Marten may avoid large stands of small diameter black spruce which have been severely burned, leaving few inclusions or stringers for cover. Burned trees may remain standing for many years so that little deadfall is available; those trees that do fall often lie directly on the ground unsupported by large root systems and provide little in the way of subnivean space. This successional stage may last up to 30 years after a fire (Foote 1983) before black spruce saplings are mature and dense enough to provide cover for marten.

When evaluating a burn as marten habitat, the amount of unburned inclusions, deadfall, small mammals, potential marten predators, coniferous regrowth, and snowfall should all be considered interdependently. The size and intensity of a fire is likely to influence not only the extent of inclusions and the type of regeneration in the burn, but also the complex of small mammals that will repopulate the burn. Proximity to extant Microtus populations will probably be more important for smaller

fires in determining food availability for marten. Regardless of the size of Microtus populations in a burn, good cover must be available for marten to exploit them. Once deadfall has deteriorated to the point where it no longer provides cover for marten, coniferous regrowth should be tall enough and dense enough to provide cover and access to subnivean space. Adequate cover in a burn includes an insulating layer of snow in winter if inclusions containing squirrel middens are not available.

Habitat manipulation for enhancing marten populations would not be cost effective for much of interior Alaska at the present time. Land managers are not likely to effectively offset any detrimental effects of habitat alterations caused by wildfire and forest succession. The high cost of fire suppression or controlled burning prohibits the widespread use of these techniques solely to create or maintain prime marten habitat. Even if large-scale habitat manipulation were feasible, careful consideration would have to be given to the long-term effect it would have on marten habitat and the habitat of other wildlife species. Small-scale habitat manipulation may be appropriate in some instances where the technique used enhances other forest values that help offset the cost of that manipulation. Examples might include restocking upland burns and clear-cuts with coniferous species to preclude the development of pure stands of birch or aspen or leaving slash piles in logging areas to provide cover for marten.

LITERATURE CITED

Alaska Department of Fish and Game. 1980. Furbearers management policies. Pages XII-3 through XII-4 in Species Management Policies, Alaska Wildlife Management Plans. Juneau.

Allen, A. W. 1984. Habitat suitability index models: marten. U.S. Fish and Wildl. Serv. FWS/OBS-82/10.11, Ft. Collins, Colo. 13pp.

Archibald, W. R., and R. H. Jessup. 1984. Population dynamics of the pine marten (Martes americana) in the Yukon Territory. Pages 81-97 in R. Olson et al., eds. Northern Ecology and Resource Management. Univ. of Alberta Press, Edmonton.

Barrett, R. H., and W. D. Spencer. 1982. A test of a pine marten habitat suitability model for the northern Sierra Nevada. USDA For. Serv. Res. Pap. NC-143. North Cent. For. Exp. Sta., St. Paul, Minn. 7pp.

Bennett, L. A. 1984. Marten ecology and habitat management in the Central Rocky Mountains. Prog. Rep. Colorado Coop. Wildl. Res. Unit, Colorado State Univ., Fort Collins. 60pp.

Brabant, A. 1922. The fire fiend's threat to the fur trade. Can. For. Mag. 83:128-131.

Brown, M. K. 1980. The status of the pine marten in New York. Trans. Northeast. Sect. The Wildl. Soc. 37:217-226.

Buskirk, S. W. 1984. Seasonal use of resting sites by marten in south-central Alaska. J. Wildl. Manage. 48(3):950-953.

_____, and S. O. MacDonald. 1984. Seasonal food habits of marten in southcentral Alaska. Can. J. Zool. 62:944-950.

Clark, T. W., E. Anderson, C. Douglas, and M. Strickland. In press. Mammalian species: Martes americana. Species Account, The American Society of Mammalogists.

Cottam, G., and J. T. Curtiss. 1956. The use of distance measures in phytosociological sampling. Ecology 37(3):451-460.

Eagle, T. C., J. Choromanski-Norris, and V. B. Kvechle. 1984. Implanting radio transmitters in mink and Franklin's ground squirrel. Wildl. Soc. Bull. 12(2):180-184.

Edwards, R. Y. 1954. Fire and the decline of a mountain caribou herd. J. Wildl. Manage. 18(4):521-526.

Foote, M. J. 1983. Classification, description, and dynamics of plant communities after fire in the taiga of interior Alaska. USDA For. Serv. Res. Pap. PNW-307. North West. For. Exp. Sta., Portland, Oreg. 108pp.

Francis, G. R., and A. B. Stephenson. 1972. Marten ranges and food habits in Algonquin Park, Ontario. Res. Rep. No. 91. Ministry Nat. Resour., Ontario. 53pp.

Fredrickson, L. F. 1981. South Dakota pine marten reintroduction study update. The Trapper 6(10):49.

Gabriel, H. W., and G. F. Tande. 1983. A regional approach to fire history in Alaska. BLM-Alaska Tech. Rep. 9, Bur. of Land Manage., U.S. Dep. Int., Anchorage, Alaska. 34pp.

Golden, H. N. 1986. Survey of furbearer populations on the Yukon Flats National Wildlife Refuge. Alaska Dep. Fish and Game Prog. Rep. and U.S. Fish and Wildl. Serv. Coop. Agree., Proj. No. 14-16-0007-84-7416. 21pp.

Grinnell, J., J. S. Dixon, and J. M. Linsdale. 1937. Furbearing mammals of California. Univ. Calif. Press, Berkeley. 1:184-210.

Hanson, W. A. 1979. Preliminary results of the Bear Creek fire effects studies. U.S. Dep. Int., Bur. Land Manage., Anchorage, Alaska. 83pp.

Hargis, C. D. 1981. Winter habitat utilization and food habits of pine martens in Yosemite National Park. M.S. Thesis, Univ. Calif., Berkeley. 57pp.

Hawley, V. D., and F. E. Newby. 1957. Marten home ranges and population fluctuations. J. Mammal. 38(2):174-184.

Herman, T., and K. Fuller. 1974. Observations of the marten, Martes americana, in the MacKenzie district, Northwest Territories. Can. Field-Nat. 88:501-503.

Johnson, L. 1981. Otter and marten life history studies. Alaska Dep. Fish and Game. Final Rep. Proj. W-17-10, W-17-11, and W-21-1. Job 7.10R. Juneau. 29pp.

Koehler, G. M., and M. G. Hornocker. 1977. Fire effects on marten habitat in the Selway-Bitterroot Wilderness. J. Wildl. Manage. 41:500-505.

_____, W. R. Moore, and A. R. Taylor. 1975. Preserving the pine marten: management guidelines for western forests. Western Wildlands 2(3):31-36.

Lensink, C. J. 1953. Population dynamics and movements of the marten in interior Alaska; food habits and habitat preferences of the marten in interior Alaska. Pages 53-79 in Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Proj. 510 W3-R-6 and 510 W3-R-7. Job No. 1 and No. 2. Juneau.

Lutz, H. J. 1956. Ecological effects of forest fires in the interior of Alaska. USDA For. Serv. Tech. Bull. 1133, Washington, D.C. 121pp.

Marshall, W. H. 1951. Pine marten as a forest product. J. Forestry 49(12):899-905.

Maxham, G. 1970. Return of the marten. Conserv. Volunteer 33:8-12.

Mech, L. D., and L. L. Rogers. 1977. Status, distribution, and movements of martens in northeastern Minnesota. USDA For. Serv. Res. Pap. NC-143. North Cent. For. Exp. Sta., St. Paul, Minn. 7pp.

Murie, A. 1961. Some food habits of the marten. J. Mammal. 42(4): 516-521.

Ohmann, L. F., and R. R. Ream. 1971. Wilderness ecology: a method of sampling and summarizing data for plant community classification. USDA For. Serv. Res. Pap. NC-49. North Cent. For. Exp. Sta., St. Paul, Minn. 14pp.

Patton, T., and R. Escano. 1983. Habitat suitability index model: marten (Martes americana). Draft copy prepared for Northern Region, U.S. For. Serv., Missoula, Mont. 20pp.

Remington, J. D. 1952. Food habits, growth, and behavior of two captive pine martens. J. Mammal. 33(1):66-70.

Simon, T. L. 1980. An ecological study of the marten in the Tahoe National Forest, California. M.S. Thesis, Calif. State Univ., Sacramento. 140pp.

Slough, B. G., and C. M. M. Smits. 1985. Yukon marten management. Prog. Rep., Yukon Fish and Wildl. Branch, Yukon Dep. Renewable Resources, Whitehorse. 57pp.

Soutiere, E. L. 1979. Effects of timber harvesting on marten in Maine. J. Wildl. Manage. 43(4):850-860.

Spencer, W. D., and W. J. Zielinski. 1983. Predatory behavior of pine martens. J. Mammal. 64(4):717-720.

_____, R. H. Barrett, and W. J. Zielinski. 1983. Marten habitat preferences in the northern Sierra Nevada. J. Wildl. Manage. 47(4):1181-1186.

Steventon, J. D., and J. T. Major. 1982. Marten use of habitat in a commercially clear-cut forest. J. Wildl. Manage. 46(1):175-182.

Stephenson, R. O. 1984. The relationship of fire history to furbearer populations and harvest. Alaska Dep. Fish and Game. Fed. Aid. in Wildl. Rest. Proj. W-22-2. Job 7.13R. Juneau. 86pp.

Tanana/Minchumina Fire Planning Team. 1982. Alaska interagency fire management plan: Tanana/Minchumina planning area. U.S. Dep. Int. Wash., D.C. 148pp.

Trigg, W. M. 1971. Fire season climatic zones of mainland Alaska. USDA For. Serv. Res. Pap. PNW-126. Pacific North West. For. Exp. Sta., Portland, Oreg. 12pp.

Viereck, L. A. 1983. The effects of fire in black spruce ecosystems of Alaska and northern Canada. Pages 201-220 in R. W. Wein and D. A. MacLean, eds. The Role of Fire in Northern Circumpolar Ecosystems. John Wiley and Sons, Ltd.

_____, C. T. Dyrness, K. VanCleave, and M. J. Foote. 1983. Vegetation, soils, and forest productivity in selected forest types in interior Alaska. Can. J. For. Res. 13:703-720.

West, S. D. 1979. Habitat responses of microtine rodents to central Alaskan forest succession. Ph.D. Thesis, Univ. California, Berkeley. 115pp.

Wolff, J. O., and W. Z. Lidicker, Jr. 1981. Communal winter nesting and food sharing in taiga voles. Behav. Ecol. Sociobiol. 9:237-240.

Wynne, K. M. 1981. Summer home range use by adult marten in northwestern Maine. M.S. Thesis, Univ. Maine, Orono. 19pp.

Yeager, L. E. 1950. Implications of some harvest and habitat factors on pine marten management. Trans. North Am. Wildl. Conf. 15:319-334.

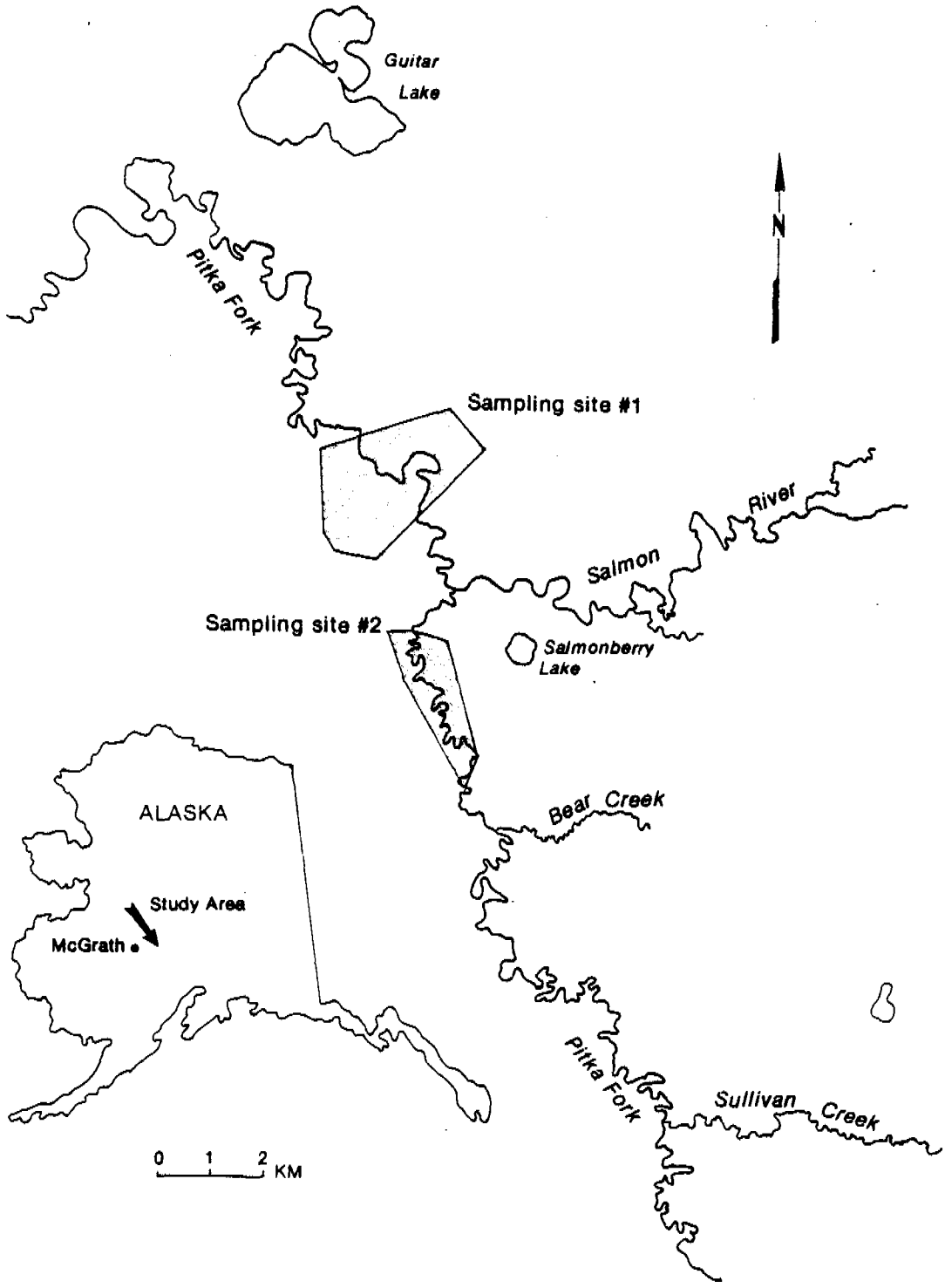

Fig. 1. Location of the study area and the vegetation sampling sites in the Bear Creek burn, Alaska, 1984-85.

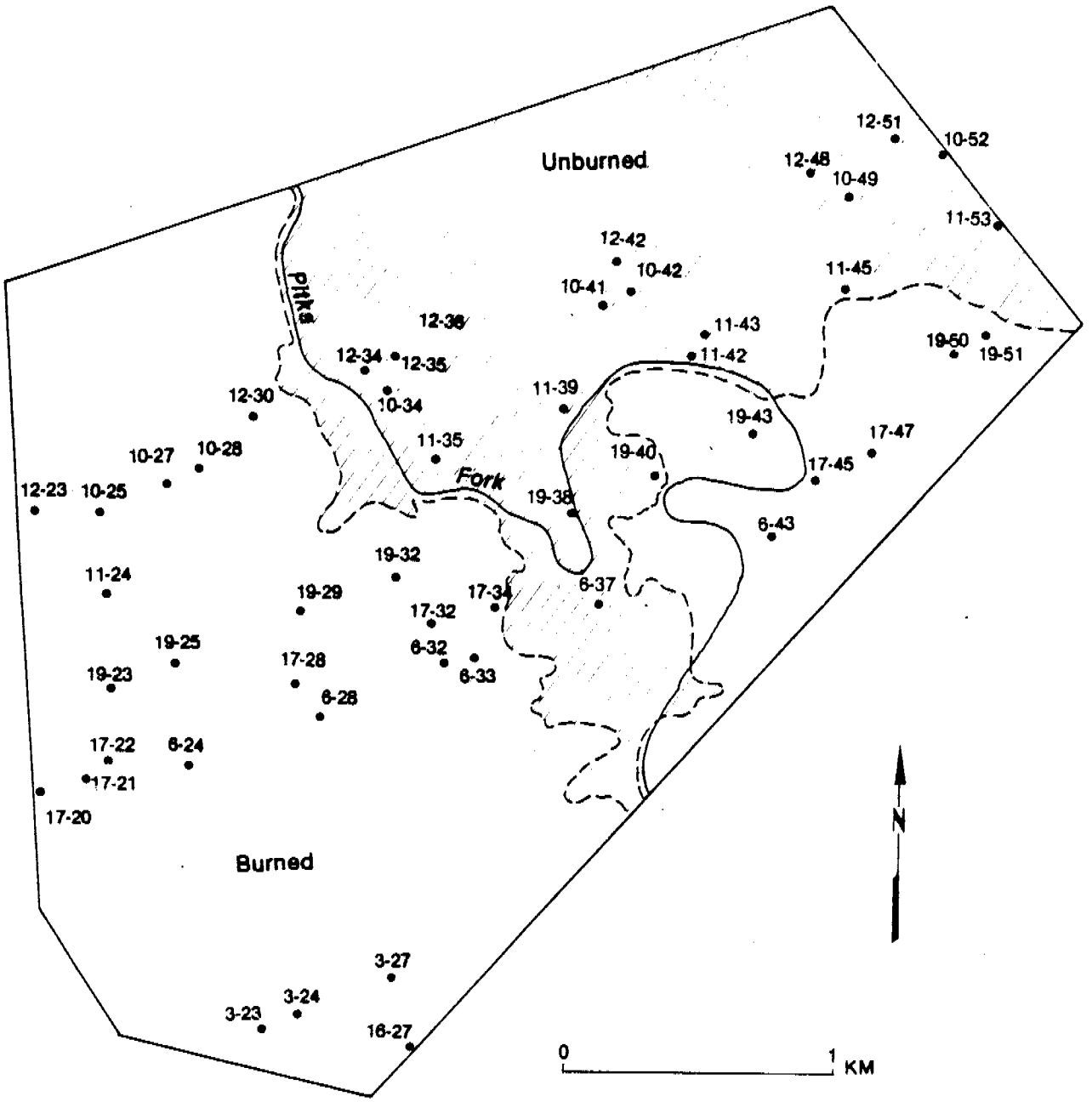

Fig. 2. Location of vegetation plots at Sampling Site #1 in the Bear Creek Burn, Alaska, August 1984.

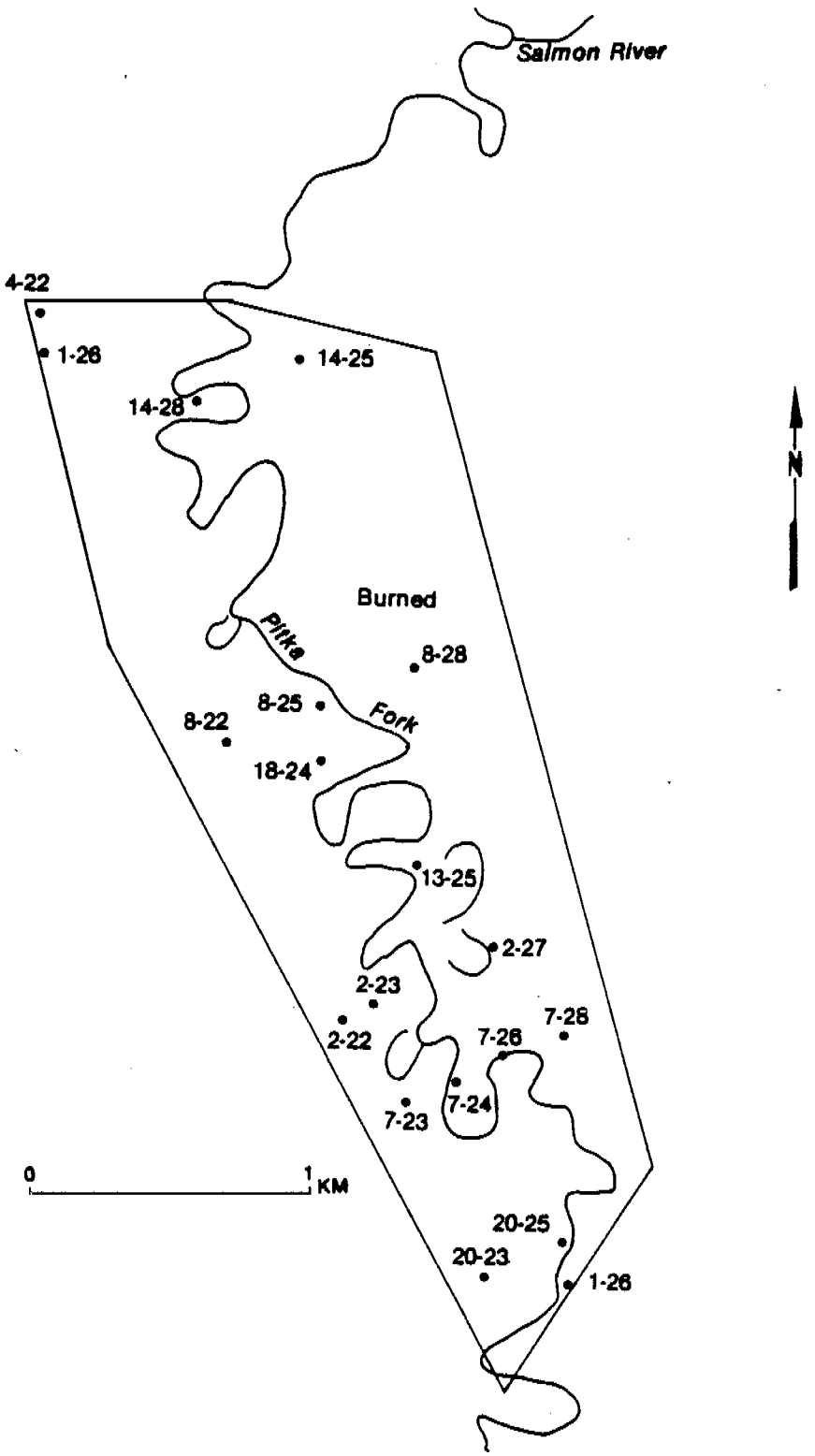

Fig. 3. Location of vegetation plots at Sampling Site #2 in the Bear Creek burn, Alaska, August 1984.

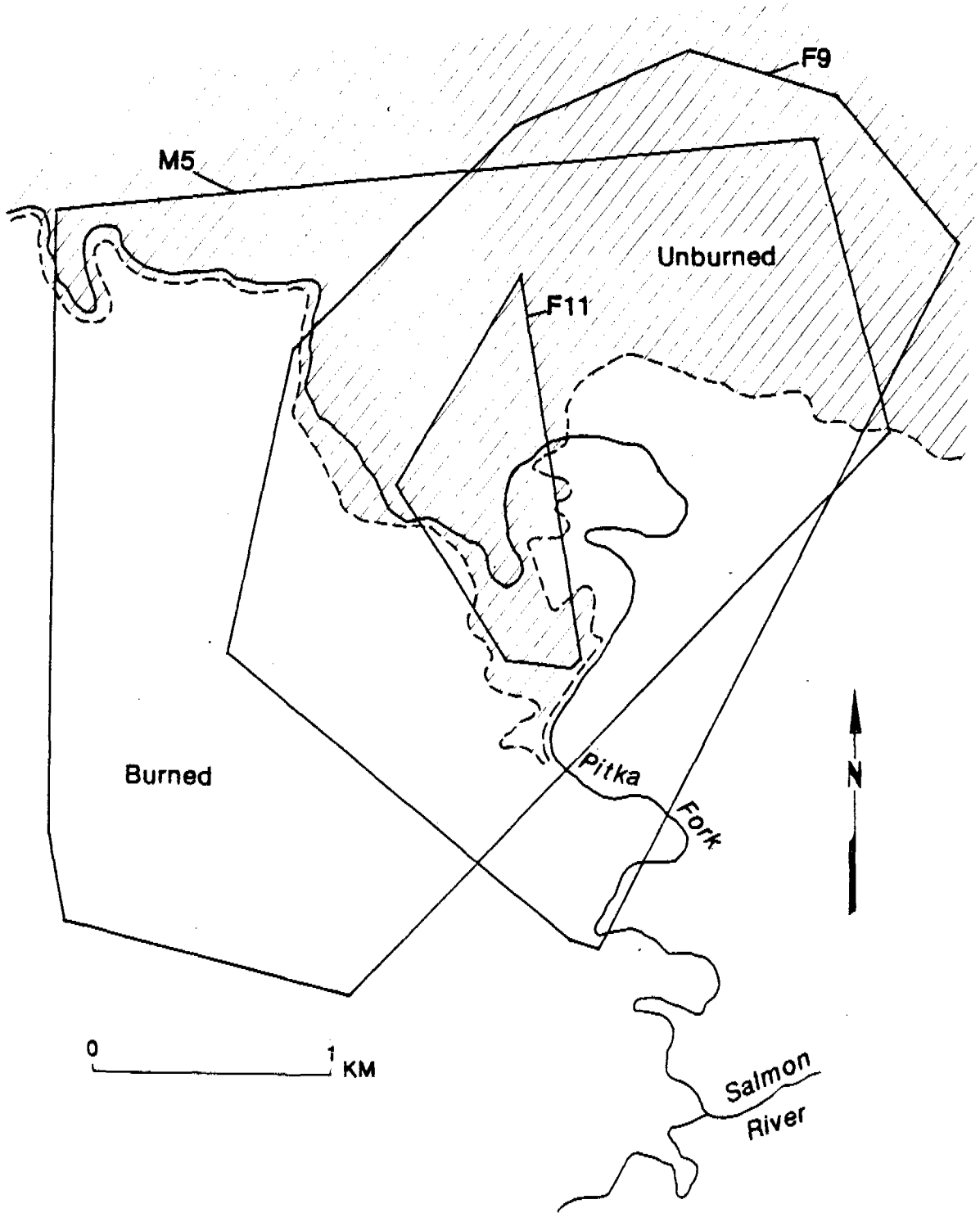

Fig. 4. Location of home ranges for martens M5, F9, and F11 in the Bear Creek burn, Alaska, 1984-85.

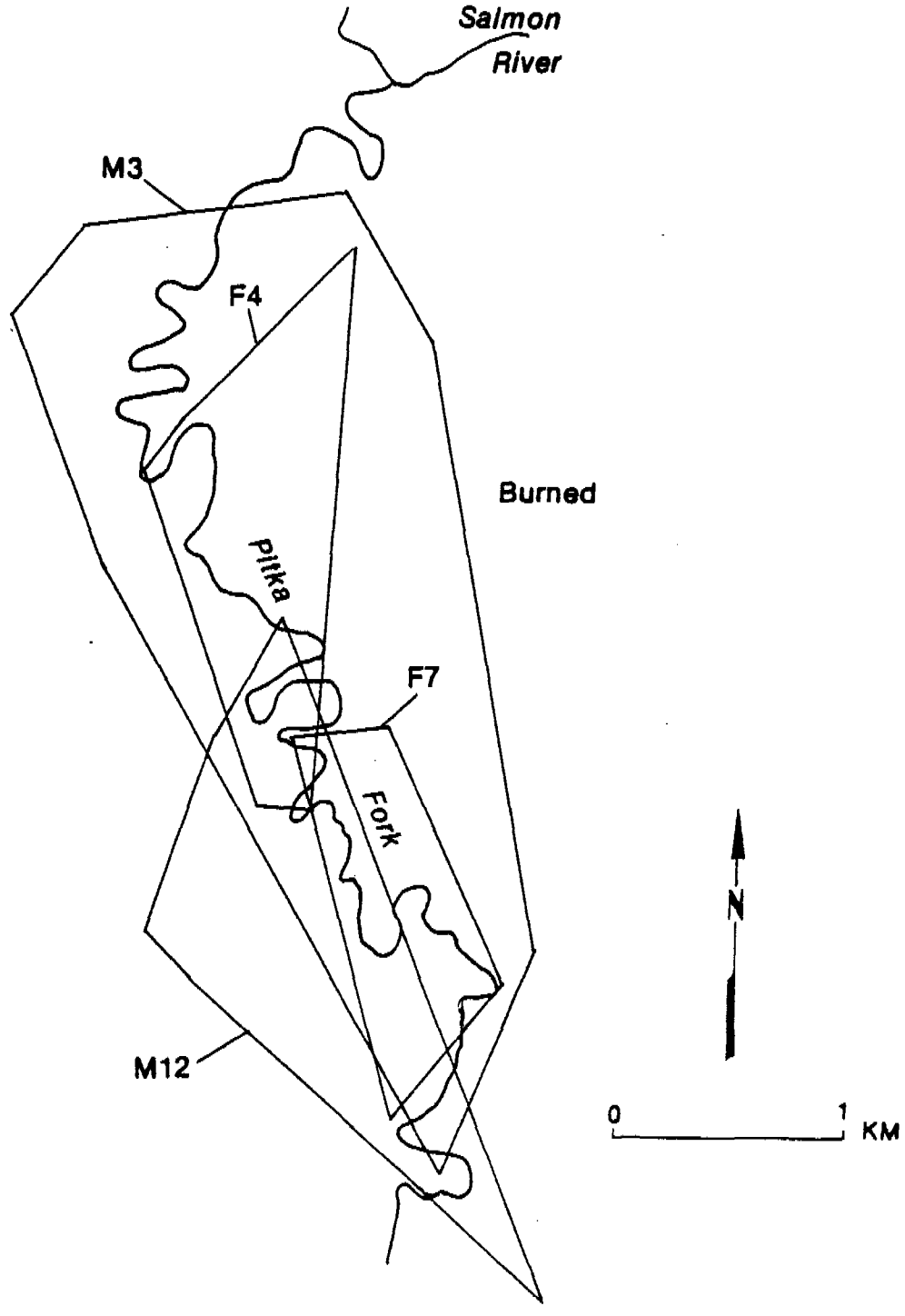

Fig. 5. Location of home ranges for martens M3, M12, F4, and F7 in the Bear Creek burn, Alaska, 1984-85.

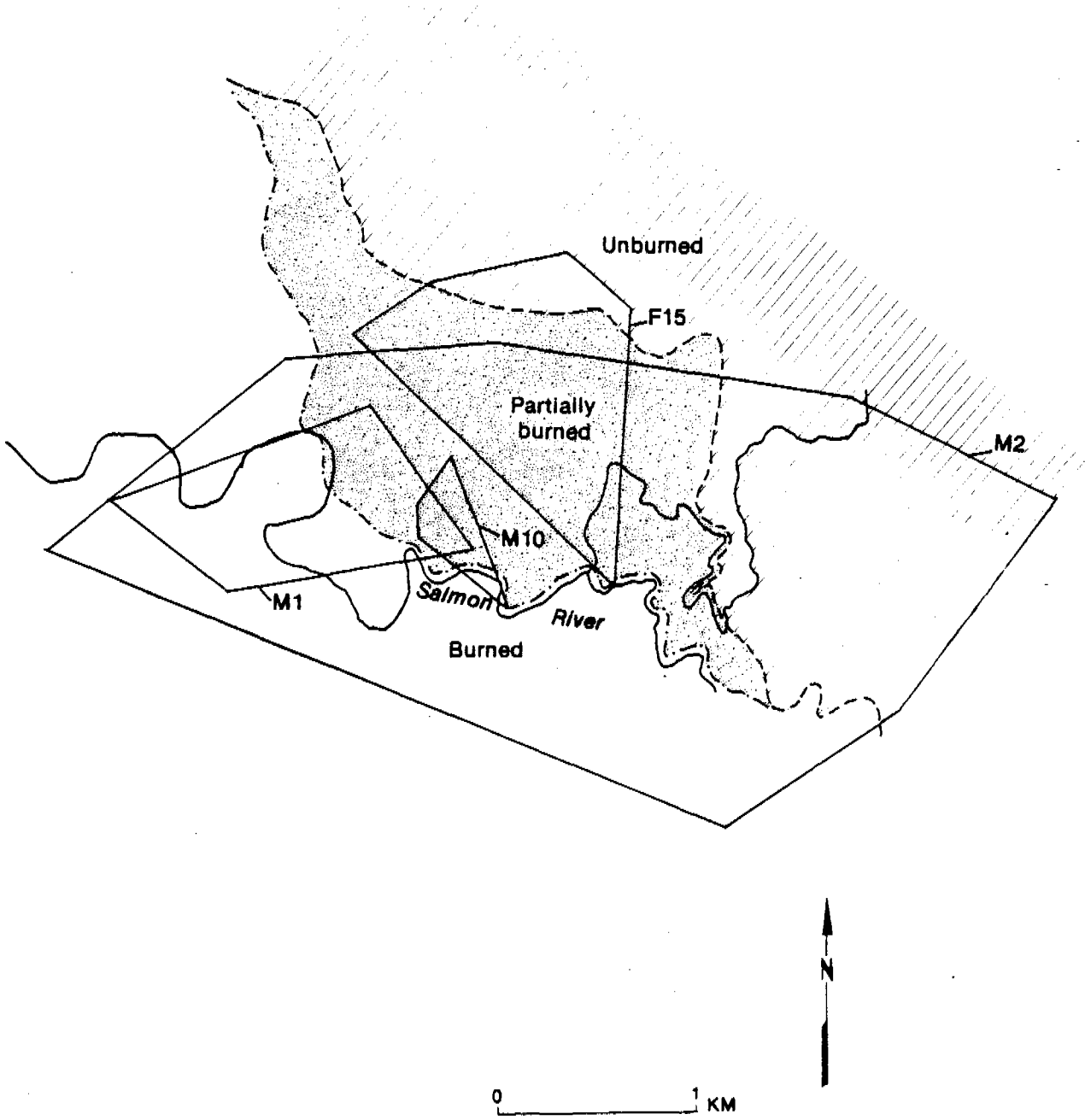

Fig. 6. Location of home ranges for martens M1, M2, M10, and F15 in the Bear Creek burn, Alaska, 1984-85.

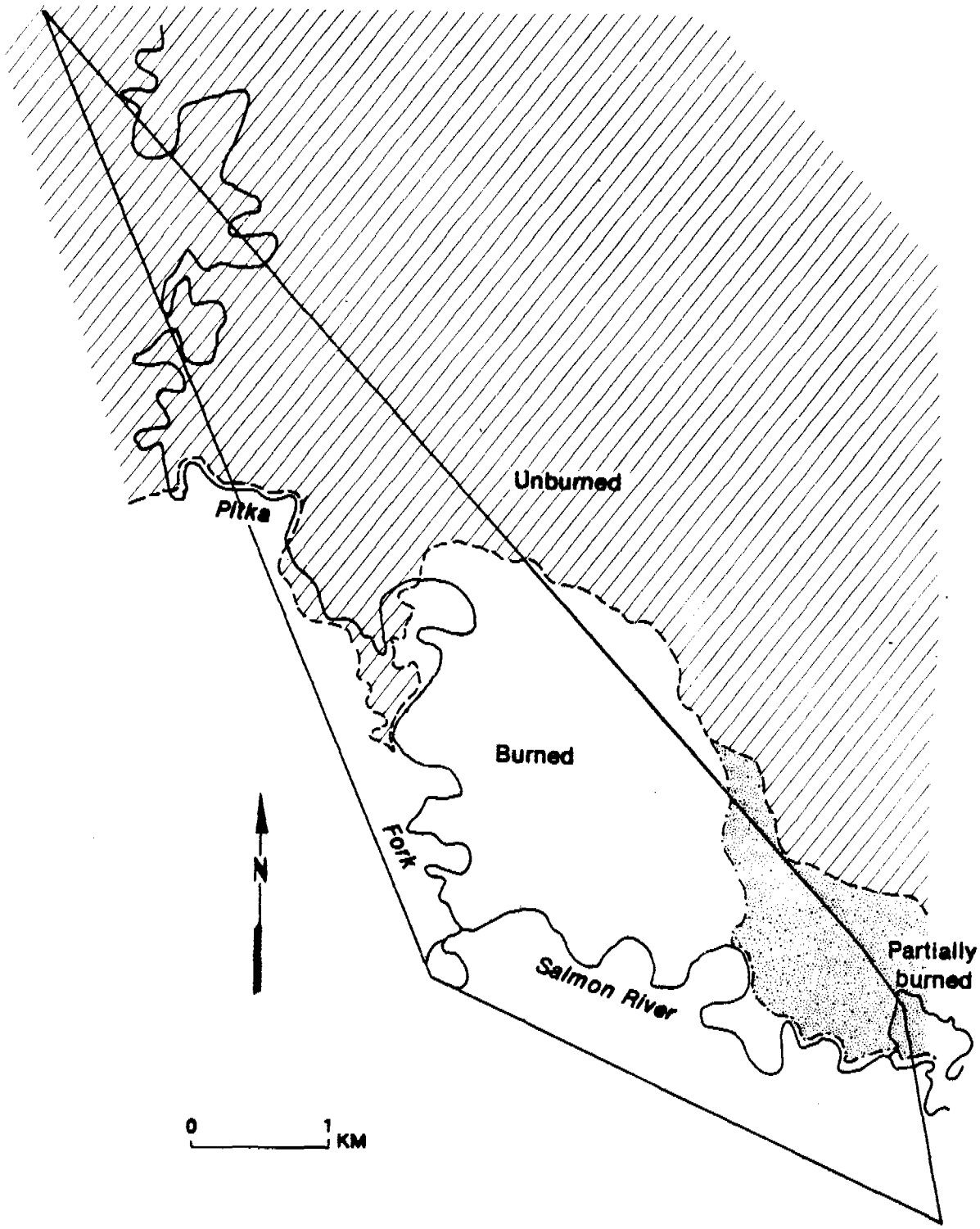

Fig. 7. Location of the home range of marten M6 in the Bear Creek burn, Alaska, 1985.

Table 1. Summary of data from vegetation plots in unburned closed white spruce stands in the Bear Creek burn, Alaska, August 1984 (plot nos. 6-37, 10-34, 11-35, 11-39, 11-42, 12-34, 19-38, and 19-40).

Log debris - occurred on 31% of the plot quadrats at an average maximum height of 24 cm and an average maximum diameter of 9 cm

Density of live trees - 920/ha with average diameter of 19 cm; 70% *Picea glauca*, 22% *Betula papyrifera*

% Cover of:	
Live trees	48
Tall shrubs	54
Low shrubs	2
Herbaceous vegetation	28
Lichens	1
Mosses	62
Live wood	0
Litter	76
Bare ground	<1
Charred ground	0
Standing water	0
Dead moss/lichen	1
Twigs & branches <5cm	31
Twigs & branches >5cm	2
Vertical stumps	5
Marchantia polymorpha	0
Mushrooms	1
Moving water	0

% Cover of Herbaceous Vegetation:	
Sedge spp.	0
Grass spp.	1
Equisetum spp.	16
Epilobium spp.	0
Potentilla palustris	0
Menyanthes trifoliata	0
Rubus chamaemorus	0
Cornus canadensis	3
Linnaea borealis	5

% Cover of Low Shrubs:	
Chamaedaphne calyculata	0
Ledum palustre	0
Andromeda polifolia	0
Oxycoccus microcarpus	1
Myrica gale	0
Vaccinium uliginosum	0

% Cover of Tall Shrubs:	
Salix spp.	3
Alnus spp.	22
Betula nana	0
Rosa acicularis	13
Viburnum edule	<1

% Cover of:	Seedlings	Saplings
Picea mariana	0	0
Picea glauca	0	<1
Betula papyrifera	<1	6
Larix laricina	0	0
Populus tremuloides	0	0

Table 2. Summary of data from vegetation plots in burned closed white spruce stands in the Bear Creek burn, Alaska, August 1984 (plot nos. 1-26, 6-47, 7-24, 8-25, 20-23, and 20-25).

Log debris - occurred on 67% of the plot quadrats at an average maximum height of 60 cm and an average maximum diameter of 15 cm

Density of live trees - <10/ha; average diameter unmeasured; no live trees within 33.3 m of the plot centers

% Cover of:	
Live trees	10
Tall shrubs	<1
Low shrubs	0
Herbaceous vegetation	37
Lichens	<1
Mosses	40
Live wood	<1
Litter	71
Bare ground	1
Charred ground	<1
Standing water	0
Dead moss/lichen	<1
Twigs & branches <5cm	20
Twigs & branches >5cm	14
Vertical stumps	1
Marchantia polymorpha	22
Mushrooms	<1
Moving water	0

% Cover of Herbaceous Vegetation:	
Sedge spp.	0
Grass spp.	2
Equisetum spp.	5
Epilobium spp.	24
Potentilla palustris	0
Menyanthes trifoliata	0
Rubus chamaemorus	0
Cornus canadensis	0
Linnaea borealis	0

% Cover of Low Shrubs:	
Chamaedaphne calyculata	0
Ledum palustre	0
Andromeda polifolia	0
Oxycoccus microcarpus	0
Myrica gale	0
Vaccinium uliginosum	0

% Cover of Tall Shrubs:	
Salix spp.	<1
Alnus spp.	0
Betula nana	0
Rosa acicularis	0
Viburnum edule	0

% Cover of:	Seedlings	Saplings
Picea mariana	<1	
Picea glauca	<1	
Betula papyrifera	16	
Larix laricina	0	
Populus tremuloides	0	

Table 3. Summary of data from vegetaion plots in the mosaic pattern of vegetation types at Sampling Site #1 in the Bear Creek burn, Alaska, August 1984 (plot nos. in unburned mosaic: 10-41, 10-42, 10-49, 10-52, 11-43, 11-45, 11-53, 12-35, 12-36, 12-42, 12-48, 12-51; plot nos. in burned mosaic: 3-23, 3-24, 3-27, 6-24, 6-28, 6-32, 6-33, 10-25, 10-27, 10-28, 11-24, 12-23, 12-30, 16-27, 17-20, 17-21, 17-22, 17-28, 17-32, 17-34, 17-47, 19-23, 19-25, 19-29, 19-32, 19-50, and 19-51).

Log debris - occurred on 19% of the quadrats within the burn at an average maximum height of 32 cm and an average maximum diameter of 9 cm; no log debris occurred on plots outside the burn.

Density of live trees - on unburned mosaic: 65/ha with an average dbh of 10 cm; 40% Larix laricina, 32% Betula papyrifera, and 24% Picea mariana; on burned mosaic: 65/ha with an average dbh of 9 cm; 44% Picea mariana, 29% Larix laricina, and 20% Betula papyrifera.

% Cover of:	Unburned	Burned	% Cover of Herbaceous Vegetation:	Unburned	Burned
Live trees	8	7	Sedge spp.	50	28
Tall shrubs	2	6	Grass spp.	9	16
Low shrubs	14	20	Equisetum spp.	6	3
Herbaceous vegetation	79	63	Epilobium spp.	0	<1
Lichens	<1	<1	Potentilla palustris	7	5
Mosses	81	45	Menyanthes trifoliata	0	1
Live wood	<1	<1	Rubus chamaemorus	0	<1
Litter	87	66	Cornus canadensis	0	0
Bare ground	<1	<1	Linnaea borealis	0	0
Charred ground	0	0			
Standing water	15	15	% Cover of Low Shrubs:		
Dead moss/lichen	<1	4	Chamaedaphne calyculata	5	10
Twigs & branches <5cm	2	8	Ledum palustre	2	4
Twigs & branches >5cm	0	2	Andromeda polifolia	2	<1
Vertical stumps	0	2	Oxycoccus microcarpus	0	2
Marchantia polymorpha	0	4	Myrica gale	0	<1
Mushrooms	<1	<1	Vaccinium uliginosum	0	<1
Moving water	0	0			

% Cover of Tall Shrubs:	Unburned	Burned
Salix spp.	6	4
Alnus spp.	<1	1
Betula spp.	15	4
Rosa acicularis	0	<1
Viburnum edule	0	0

% Cover of:	Seedlings		Saplings	
	Unburned	Burned	Unburned	Burned
Picea mariana	0	1	0	<1
Picea glauca	0	<1	0	0
Betula papyrifera	0	3	0	2
Larix laricina	<1	<1	0	<1
Populus tremuloides	0	<1	0	0

Table 4. Summary of data from vegetation plots in the burned mosaic pattern of vegetation types at Sampling Site #2 in the Bear Creek burn, Alaska, August 1984 (plot nos. 2-22, 2-23, 2-27, 4-22, 7-23, 7-28, 8-22, 8-28, 9-22, 14-25, and 18-24).

Log debris - occurred on 50% of the plot quadrats at an average maximum height of 26 cm and an average maximum diameter of 9 cm.

Density of live trees - 12/ha with an average diameter of 8 cm; 50% *Betula papyrifera*, 50% *Larix laricina*

% Cover of:	
Live trees	10
Tall shrubs	15
Low shrubs	2
Herbaceous vegetation	62
Lichens	<1
Mosses	49
Live wood	<1
Litter	67
Bare ground	1
Charred ground	<1
Standing water	<1
Dead moss/lichen	2
Twigs & branches <5cm	8
Twigs & branches >5cm	7
Vertical stumps	<1
Marchantia polymorpha	12
Mushrooms	<1
Moving water	1

% Cover of Herbaceous Vegetation:	
Sedge spp.	8
Grass spp.	29
Equisetum spp.	19
Epilobium spp.	3
Potentilla palustris	1
Menyanthes trifoliata	0
Rubus chamaemorus	0
Cornus canadensis	0
Linnaea borealis	0

% Cover of Low Shrubs:	
Chamaedaphne calyculata	0
Ledum palustre	0
Andromeda polifolia	0
Oxycoccus microcarpus	0
Myrica gale	<1
Vaccinium uliginosum	0

% Cover of Tall Shrubs:	
Salix spp.	3
Alnus spp.	3
Betula nana	3
Rosa acicularis	<1
Viburnum edule	0

% Cover of:	Seedlings	Saplings
Picea mariana	2	0
Picea glauca	<1	0
Betula papyrifera	15	4
Larix laricina	<1	0
Populus tremuloides	0	0

Table 5. Fate of radio-tagged martens in the Bear Creek burn, Alaska, 1984-85.

Marten[a]	Date of first capture	Area of capture[b]	Date of last live relocation	Date of last relocation or attempted relocation	Reason for terminating tracking	Cause of death[c]
M1	22 Mar 84	Salmon R.	22 Apr 84	9 May 84	Dead	Possibly predation
M2	5 Apr 84	Salmon R.	27 Sep 84	16 Oct 84	Battery failure	N.A.
M3	9 Apr 84	Upper P. R.	3 Mar 85	9 Mar 85	Dead	Possibly surgery-related
F4	14 Apr 84	Upper P. R.	22 Apr 84	22 Apr 84	Signal disappeared	N.A.
M5	14 Apr 84	Lower P.R.	26 Oct 84	__ Feb 85	Battery failure	Trapped outside burn
M6	15 Mar 85	Salmon R.	26 Oct 85	26 Oct 85	Battery failure	N.A.
F7	3 Mar 85	Upper P.R.	15 May 85	2 Jun 85	Dead	Predation
M8	21 Mar 85	Salmon R.	21 Mar 85	9 Apr 85	Dead	Possibly surgery-related or predation
F9	11 Mar 85	Lower P.R.	24 Jul 85	9 Sep 85	Battery failure	N.A.
M10	21 Mar 85	Salmon R.	5 Apr 85	12 Apr 85	Dead	Possibly predation
F11	20 Mar 85	Lower P.R.	19 Apr 85	22 Dec 85	Signal disappeared	Trapped outside the study area
M12	3 Apr 85	Upper P.R.	12 Apr 85	16 Dec 85	Signal disappeared	Trapped outside the study area
F13	23 Mar 85	Lower P.R.	N.A.	N.A.	Ear-tagged only	N.A.
M14	8 Apr 85	Upper P.R.	12 Apr 85	1 May 85	Dead	Possibly surgery-related
F15	24 Mar 85	Salmon R.	24 Jul 85	9 Sep 85	Battery failure	N.A.
M16	18 Apr 85	Upper P.R.	N.A.	N.A.	Dead	Surgery-related
M18	13 Aug 85	Upper P.R.	14 Aug 85	4 Oct 85	Dead	Possibly surgery-related

[a] M = male; F = female.
[b] P.R. = Pitka River.
[c] If a marten died within 3 weeks of the implant surgery, the death was attributed to complications of the surgery; otherwise, predation was assumed if the cause of death was unknown.

Table 6. Minimum home range size, number of locations[a], and tracking period for radio-tagged marten in the Bear Creek burn, Alaska, 1984-85.

Marten	Size of home range (km^2)[b]	No. radio locations	Duration of tracking period
M1	0.81	13	Late Mar-early May 1984
M2	6.54	28	Apr-May, Jul-Sep 1984
M3	3.47	26	Apr-May, Jul-Oct 1984
F4	0.82	6	Apr 1984
M5	8.20	23	Apr-May, Jul-Oct 1984
M6	16.68	35	Mar-Jul, Sep-Oct 1985
F7	0.53	17	Mar-May 1985
F9	6.00	46	Mar- Jul 1985
M10	0.11	4	Late Mar-early Apr 1985
F11	0.61	14	Mar-Apr 1985
M12	1.17	6	Apr 1985
F15	1.11	17	Mar-Jul 1985

[a] Includes both aerial and ground radio-tracking locations.

[b] Home ranges are based on a limited number of radiolocations that generally covered less than a 6-month period and should be considered minimum estimates of home range size; M6 had an unusually long movement to the NW for a short period in early June.

Table 7. Distribution of radiolocations by habitat for marten in the Bear Creek burn, Alaska, 1984-85.[a]

Marten	Percent of home range in the following habitat			Percent of radiolocations in the following habitat			Percent of radiolocations in trees that were[b]	
	Burned	Partially burned	Unburned	Burned	Partially burned	Unburned	Burned	Unburned
M1	69	31	0	38	62	0	31	54
M2	41	32	27	34	34	31	35	38
M3	100	0	0	100	0	0	92	0
M5	62	0	38	65	0	35	30	61
M6	62	8	30	35	56	9	24	52
M9	46	0	54	60	0	40	12	88
M15	0	85	15	0	50	50	0	75

[a] Only locations obtained through aerial tracking were used because locations from ground tracking were limited by accessibility and range of transmitter reception. Only marten with at least 10 locations are presented.

[b] The remaining radiolocations were in partially burned trees or at the interface of a burned and unburned stand.

Table 8. The proportion of small mammal species taken by marten outside the Bear Creek burn and captured on small mammal traplines inside and outside the Bear Creek burn, Alaska, 1983-86.

Species	Percentage of total voles, lemmings, and mice		
	Found in intestinal tracts of marten trapped outside the burn n = 180	Taken from small mammal traplines outside the burn n = 156	Taken from small mammal traplines inside the burn n = 118
Clethrionomys rutilus	27	78	37
Microtus xanthognathus	22	17	32
Microtus pennsylvanicus	23	1	8
Microtus oeconomus	1	1	8
Synaptomys borealis	23	2	13
Lemmus sibiricus	3	1	0
Zapus hudsonicus	0	0	2
Total small mammals captured	217	328	347
	Percentage of total small mammals captured		
% *Sorex* spp.[a]	17	52	66

[a] The majority of shrews captured in the study area were *Sorex cinereus*. *Sorex hoyi* constituted 3-10% of the samples. Only 1 *Sorex monticolus* was captured.

Table 9. Comparison of trapping success by year and habitat type for small mammal species trapped in the Bear Creek burn, Alaska, during August 1984-86.

	Total trap nights	Total per 100 trap nights	Voles, lemmings, and mice per 100 trap nights	Shrews per 100 trap nights
1984[a]				
Burned white spruce	450	7.7	5.5	2.2
Unburned white spruce	450	17.6	15.3	2.2
1985				
Burned white spruce	600	5.5	5.0	0.5
Unburned white spruce	600	4.0	2.5	1.5
Burned black spruce	600	3.3	2.8	0.5
Unburned black spruce	600	4.0	3.2	0.8
1986				
Burned white spruce	360	25.0	8.9	16.1
Unburned white spruce	360	15.6	7.8	7.8
Burned mosaic	1200	14.4	1.5	12.9
Unburned mosaic	1200	12.0	2.0	10.0

[a] Pitfall traps were not used in 1984 and possibly affected the species composition and success rate; however, all species except possibly Sorex hoyi, Synaptomys borealis, and Zapus hudsonicus were collected in snaptraps.

Table 10. Relative abundance of microtine rodents as a percentage of total trapped per habitat type as determined by small mammal trapping inside and outside the Bear Creek burn, Alaska, in August 1984-86. The number trapped per 100 trap nights is given in parentheses for the 2 most common species in white spruce.

Species	Burned white spruce	Unburned white spruce
1984	n = 25	n = 69
Clethrionomys rutilus	76(4.2)	87(13.3)
Microtus xanthognathus	4(0.9)	13(2.9)
Microtus pennsylvanicus	-[a]	0
Microtus oeconomus	-[a]	0
Synaptomys borealis	-[a]	0
Lemmus sibiricus	-[a]	0
Zapus hudsonicus	0	0

Species	Burned white spruce	Unburned white spruce	Burned black spruce	Unburned black spruce
1985	n = 30	n = 15	n = 17	n = 19
Clethrionomys rutilus	27(1.3)	87(2.2)	6	84
Microtus xanthognathus	73(3.6)	0(0.0)	29	5
Microtus pennsylvanicus	0	7	6	0
Microtus oeconomus	0	7	12	0
Synaptomys borealis	0	0	47	11
Lemmus sibiricus	0	0	0	0
Zapus hudsonicus	0	0	0	0

Species	Burned white spruce	Unburned white spruce	Burned mosaic	Unburned mosaic
1986	n = 32	n = 28	n = 18	n = 25
Clethrionomys rutilus	41(3.6)	75(5.8)	17	48
Microtus xanthognathus	47(4.2)	25(1.9)	0	40
Microtus pennsylvanicus	0	0	28	0
Microtus oeconomus	0	0	39	0
Synaptomys borealis	6	0	11	8
Lemmus sibiricus	0	0	0	4
Zapus hudsonicus	6	0	6	0

[a] Five individuals (20% of the total) were lost before identification could be made for these 4 species; none of the 5 were M. xanthognathus or C. rutilus.

Table 11. Percent cover and berries per plot for habitats within the study area ($\bar{x}$, SD, and no. of occurrences).

	Vaccinium uliginosum	Vaccinium vitis-idaea	Rosa acicularis	Rubus chamaemorus	Geocaulon lividum	Rubus arcticus	Arctostaphylos uva-ursi	Viburnum edule	Ribes hudsonianum
UNBURNED									
Mixed wood									
% cover	0.30,1.13,2	9.35,8.76,17	27.00,26.28,16		1.45,3.09,5			0.15,0.67,1	0.25,1.12,1
berries/plot	0,0,0	0.45,1.79,2	1.75,3.57,9		0.60,1.88,3			0,0,0	0.70,3.13,1
Open conifer/ Wet meadow									
% cover	27.50,30.64,18		0.20,0.70,2						
berries/plot	84.85,126.27,18		0,0,0						
Black spruce									
% cover	12.65,12.84,17	14.40,10.59,18	0.05,0.22,1	0.55,0.94,7	1.60,2.62,8		0.10,0.31,2		
berries/plot	17.25,39.62,13	20.40,24.80,15	0,0,0	0,0,0	0,0,0		0,0,0		
Wet meadow									
% cover									
berries/plot									
BURNED									
Mixed wood									
% cover	0.25,1.12,1	0.25,1.12,1	0.10,0.45,1			0.85,2.66,2			
berries/plot	0,0,0	0,0,0	0,0,0			0,0,0			
Open conifer/ wet meadow[a]									
% cover	3.30,3.53,6	0.50,1.27,2		4.00,3.77,8					
berries/plot	1.90,3.73,3	0,0,0		0,0,0					
Black spruce									
% cover	3.00,3.52,13	8.55,8.60,17	0.75,1.86,5	12.10,11.26,18	0.10,0.31,2				
berries/plot	6.55,21.96,9	12.95,25.53,9	0.10,0.31,2	1.35,3.36,3	0,0,0				
White spruce									
% cover			1.00,4.47,1						
berries/plot			0.55,2.46,1						

[a] Only 10 plots sampled; all others had 20 plots.

Appendix A. Vegetation plots sampled in the Bear Creek burn, Alaska, 1984.

For the vegetation plots marked with an asterisk, photographs are on file with the Alaska Department of Fish and Game, 1300 College Road, Fairbanks, Alaska 99701 and the Bureau of Land Management, Anchorage District Office 040, 6881 Abbott Loop Road, Anchorage, Alaska 99507.

VEGETATION PLOT NUMBER - 1-26 *

		Quadrat			
		1	2	3	4
Litter Depth (cm)	-	15	24	10	14
Height of Log Debris (cm)	-	20	24	23	20
Largest Diameter of Log Debris (cm)	-	10	9	9	8
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-		28.0,8	15.0,13	
Nearest sapling (m, mm)	-	10.7,10	1.8,3	4.5,2	1.2,2

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-	1	Sedge spp.	-	
Tall shrubs	-		Grass spp.	-	10
Low shrubs	-		Equisetum spp.	-	
Herbaceous vegetation	-	30	Epilobium spp.	-	25
Lichens	-		Potentilla palustris	-	
Mosses	-	15	Menyanthes trifoliata	-	
Live wood	-	1	Rubus chamaemorus	-	
Litter	-	97	Cornus canadensis	-	
Bare ground	-		Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	20	Ledum palustre	-	
Twigs & branches >5cm	-	20	Andromeda polifolia	-	
Vertical stumps	-		Oxycoccus microcarpus	-	
Marchantia polymorpha	-	20	Myrica gale	-	
Mushrooms	-	1	Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	- 30(47)	1
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 2-22 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	1	4	7	7
Height of Log Debris (cm)	-	15	15		
Largest Diameter of Log Debris (cm)	-	6	6		
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-		16.0,10	9.4,8	5.7,8
Nearest sapling (m, mm)	-	1.8,4	0.8,4	6.0,9	0.6,3

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-		Sedge spp.	-	
Tall shrubs	-	25	Grass spp.	-	
Low shrubs	-		Equisetum spp.	-	90
Herbaceous vegetation	-	95	Epilobium spp.	-	
Lichens	-		Potentilla palustris	-	
Mosses	-	98	Menyanthes trifoliata	-	
Live wood	-	1	Rubus chamaemorus	-	
Litter	-	1	Cornus canadensis	-	
Bare ground	-	1	Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	8	Ledum palustre	-	
Twigs & branches >5cm	-	4	Andromeda polifolia	-	
Vertical stumps	-		Oxycoccus microcarpus	-	
Marchantia polymorpha	-	1	Myrica gale	-	
Mushrooms	-	1	Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	1(12)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-	1(9)	
Picea glauca (WS)	-		
Betula papyrifera (B)	-	15(14)	10
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 2-23 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	3	9	7	11
Height of Log Debris (cm)	-				20
Largest Diameter of Log Debris (cm)	-				14
Distance to and Diameter of:					
Nearest live tree (m, cm)	-		12.2,7	12.4,7	
Nearest dead tree (m, cm)	-	19.2,10	27.4,8	9.4,7	9.6,7
Nearest sapling (m, mm)	-	0.9,7	0.9,9	4.0,5	3.5,8

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-	45	Sedge spp.	-
Tall shrubs	-	5	Grass spp.	- 10
Low shrubs	-	3	Equisetum spp.	- 70
Herbaceous vegetation	-	85	Epilobium spp.	-
Lichens	-	1	Potentilla palustris	-
Mosses	-	95	Menyanthes trifoliata	-
Live wood	-	1	Rubus chamaemorus	-
Litter	-	85	Cornus canadensis	-
Bare ground	-	1	Linnaea borealis	-
Charred ground	-			
Standing water	-		% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	-
Twigs & branches <5cm	-		Ledum palustre	-
Twigs & branches >5cm	-	2	Andromeda polifolia	-
Vertical stumps	-	1	Oxycoccus microcarpus	-
Marchantia polymorpha	-	1	Myrica gale	-
Mushrooms	-	1	Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	4(18)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-	15(9)	
Picea glauca (WS)	-		
Betula papyrifera (B)	-	20(11)	20
Larix laricina (L)	-	10(1)	
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 2-27 *

	Quadrat 1	2	3	4
Litter Depth (cm)	7	8		6
Height of Log Debris (cm)	13		12	
Largest Diameter of Log Debris (cm)	5		11	
Distance to and Diameter of:				
Nearest live tree (m, cm)				
Nearest dead tree (m, cm)	6.0,12	4.2,12	2.1,14	3.8,9
Nearest sapling (m, mm)	4.5,4	3.5,5	7.0,10	3.9,3

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	15	Sedge spp.	-
Tall shrubs	25	Grass spp.	-
Low shrubs	10	Equisetum spp.	15
Herbaceous vegetation	20	Epilobium spp.	-
Lichens	1	Potentilla palustris	-
Mosses	50	Menyanthes trifoliata	-
Live wood	1	Rubus chamaemorus	-
Litter	60	Cornus canadensis	-
Bare ground	1	Linnaea borealis	-
Charred ground	1		
Standing water	-	% Cover of Low Shrubs:	
Dead moss/lichen	1	Chamaedaphne calyculata	-
Twigs & branches <5cm	8	Ledum palustre	-
Twigs & branches >5cm	15	Andromeda polifolia	-
Vertical stumps	-	Oxycoccus microcarpus	-
Marchantia polymorpha	1	Myrica gale	-
Mushrooms	-	Vaccinium uliginosum	-
Moving water	-		

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	9(8)
Alnus spp.	-	35(4)
Betula nana	-	
Rosa acicularis	-	8(7)
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-	5(3)	
Picea glauca (WS)	-		
Betula papyrifera (B)	-	50(72)	15
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 3-23 *

	Quadrat 1	2	3	4
Litter Depth (cm) -	21	15	17	18
Height of Log Debris (cm) -				
Largest Diameter of Log Debris (cm) -				
Distance to and Diameter of:				
Nearest live tree (m, cm) -				
Nearest dead tree (m, cm) -				
Nearest sapling (m, mm) -				

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-		Sedge spp.	- 40
Tall shrubs	-	10	Grass spp.	-
Low shrubs	-	70	Equisetum spp.	-
Herbaceous vegetation	-	80	Epilobium spp.	-
Lichens	-		Potentilla palustris	- 10
Mosses	-	85	Menyanthes trifoliata	- 25
Live wood	-		Rubus chamaemorus	-
Litter	-	90	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-	11	% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	- 70
Twigs & branches <5cm	-		Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	4(19)
Alnus spp.	-	
Betula nana	-	5(37)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 3-24 *

	Quadrat 1	2	3	4
Litter Depth (cm)	25	22	12	18
Height of Log Debris (cm)				
Largest Diameter of Log Debris (cm)				
Distance to and Diameter of:				
Nearest live tree (m, cm)				
Nearest dead tree (m, cm)	8.1,6	9.9,8	16.0,8	15.0,13
Nearest sapling (m, mm)				

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	-	Sedge spp.	- 10
Tall shrubs	- 2	Grass spp.	- 70
Low shrubs	- 3	Equisetum spp.	-
Herbaceous vegetation	- 85	Epilobium spp.	-
Lichens	-	Potentilla palustris	-
Mosses	- 50	Menyanthes trifoliata	-
Live wood	-	Rubus chamaemorus	-
Litter	- 90	Cornus canadensis	-
Bare ground	-	Linnaea borealis	-
Charred ground	-		
Standing water	- 2	% Cover of Low Shrubs:	
Dead moss/lichen	-	Chamaedaphne calyculata	-
Twigs & branches <5cm	- 4	Ledum palustre	-
Twigs & branches >5cm	-	Andromeda polifolia	-
Vertical stumps	-	Oxycoccus microcarpus	-
Marchantia polymorpha	- 1	Myrica gale	-
Mushrooms	-	Vaccinium uliginosum	-
Moving water	-		

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	- 2(10)
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 3-27 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	4	14	17	10
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-	9.7,8	5.0,7		7.8,9
Nearest sapling (m, mm)	-	10.1,1	5.1,16	8.9,4	7.6,6

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-		Sedge spp.	- 95
Tall shrubs	-		Grass spp.	-
Low shrubs	-		Equisetum spp.	-
Herbaceous vegetation	-	96	Epilobium spp.	-
Lichens	-		Potentilla palustris	-
Mosses	-		Menyanthes trifoliata	-
Live wood	-		Rubus chamaemorus	-
Litter	-	98	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-	99	% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	-
Twigs & branches <5cm	-		Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:

Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 4-22

		Quadrat 1	2	3	4
Litter Depth (cm)	-	19	6	8	6
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-	5.4,8	8.4,7	1.0,12	4.4,13
Nearest sapling (m, mm)	-	10.8,3	23.9,5	3.8,5	31.4,15

% Cover of:		
Live trees	-	
Tall shrubs	-	
Low shrubs	-	
Herbaceous vegetation	-	95
Lichens	-	
Mosses	-	70
Live wood	-	
Litter	-	95
Bare ground	-	
Charred ground	-	
Standing water	-	1
Dead moss/lichen	-	
Twigs & branches <5cm	-	2
Twigs & branches >5cm	-	
Vertical stumps	-	
Marchantia polymorpha	-	
Mushrooms	-	
Moving water	-	

% Cover of Herbaceous Vegetation:		
Sedge spp.	-	92
Grass spp.	-	
Equisetum spp.	-	
Epilobium spp.	-	
Potentilla palustris	-	
Menyanthes trifoliata	-	
Rubus chamaemorus	-	
Cornus canadensis	-	
Linnaea borealis	-	
% Cover of Low Shrubs:		
Chamaedaphne calyculata	-	
Ledum palustre	-	
Andromeda polifolia	-	
Oxycoccus microcarpus	-	
Myrica gale	-	
Vaccinium uliginosum	-	

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 6-24

		Quadrat			
		1	2	3	4
Litter Depth (cm)	-	12	18	13	16
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-			23.7,8	
Nearest sapling (m, mm)	-	19.3,2	15.8,14	0.8,3	12.7,11

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-	2	Sedge spp.	-	
Tall shrubs	-	3	Grass spp.	-	35
Low shrubs	-	95	Equisetum spp.	-	
Herbaceous vegetation	-	40	Epilobium spp.	-	
Lichens	-		Potentilla palustris	-	
Mosses	-	95	Menyanthes trifoliata	-	
Live wood	-		Rubus chamaemorus	-	
Litter	-	95	Cornus canadensis	-	
Bare ground	-	1	Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	40
Twigs & branches <5cm	-		Ledum palustre	-	
Twigs & branches >5cm	-		Andromeda polifolia	-	
Vertical stumps	-		Oxycoccus microcarpus	-	
Marchantia polymorpha	-	1	Myrica gale	-	55
Mushrooms	-		Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	
Betula nana	-	10(13)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-		
Picea glauca (WS)	-		
Betula papyrifera (B)	-	10(16)	5
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 6-28

		Quadrat 1	2	3	4
Litter Depth (cm)	-	12	16	16	15
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-	15.5,9			
Nearest dead tree (m, cm)	-	12.7,8	23.6,11		
Nearest sapling (m, mm)	-		25.8,2	8.2,1	8.0,4

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-		Sedge spp.	- 70
Tall shrubs	-	2	Grass spp.	- 20
Low shrubs	-		Equisetum spp.	-
Herbaceous vegetation	-	95	Epilobium spp.	-
Lichens	-		Potentilla palustris	- 15
Mosses	-	40	Menyanthes trifoliata	-
Live wood	-		Rubus chamaemorus	-
Litter	-	90	Cornus canadensis	-
Bare ground	-	1	Linnaea borealis	-
Charred ground	-			
Standing water	-		% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	-
Twigs & branches <5cm	-		Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-	1	Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	1(9)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 6-32

		Quadrat 1	2	3	4
Litter Depth (cm)	-		13		8
Height of Log Debris (cm)	-	36	36	39	
Largest Diameter of Log Debris (cm)	-	15	12	5	
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-	8.6,8			30.8,6
Nearest sapling (m, mm)	-	7.9,4	2.5,8		20.7,2

% Cover of:		
Live trees	-	1
Tall shrubs	-	
Low shrubs	-	
Herbaceous vegetation	-	20
Lichens	-	1
Mosses	-	5
Live wood	-	1
Litter	-	7
Bare ground	-	3
Charred ground	-	
Standing water	-	
Dead moss/lichen	-	
Twigs & branches <5cm	-	50
Twigs & branches >5cm	-	30
Vertical stumps	-	
Marchantia polymorpha	-	90
Mushrooms	-	
Moving water	-	

% Cover of Herbaceous Vegetation:	
Sedge spp.	-
Grass spp.	-
Equisetum spp.	-
Epilobium spp.	-
Potentilla palustris	-
Menyanthes trifoliata	-
Rubus chamaemorus	-
Cornus canadensis	-
Linnaea borealis	-

% Cover of Low Shrubs:	
Chamaedaphne calyculata	-
Ledum palustre	-
Andromeda polifolia	-
Oxycoccus microcarpus	-
Myrica gale	-
Vaccinium uliginosum	-

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	1(1)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	1(8)
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 6-33

	Quadrat 1	2	3	4
Litter Depth (cm)	12	9	9	7
Height of Log Debris (cm)				
Largest Diameter of Log Debris (cm)				
Distance to and Diameter of:				
Nearest live tree (m, cm)		25.3,6	15.3,6	
Nearest dead tree (m, cm)			12.1,7	25.6,12
Nearest sapling (m, mm)	5.8,8		17.0,30	14.4,04

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-		Sedge spp.	- 30
Tall shrubs	-	1	Grass spp.	- 10
Low shrubs	-	7	Equisetum spp.	-
Herbaceous vegetation	-	75	Epilobium spp.	-
Lichens	-		Potentilla palustris	- 35
Mosses	-		Menyanthes trifoliata	-
Live wood	-		Rubus chamaemorus	-
Litter	-	95	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-	8	% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	-
Twigs & branches <5cm	-		Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	1(1)
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 6-37 *

	Quadrat 1	2	3	4
Litter Depth (cm)	2		3	
Height of Log Debris (cm)	33	19	13	
Largest Diameter of Log Debris (cm)	11	12	10	
Distance to and Diameter of:				
Nearest live tree (m, cm)	1.9,17	2.2,9	2.5,14	2.5,11
Nearest dead tree (m, cm)	6.8,9	8.1,8	12.1,9	1.3,11
Nearest sapling (m, mm)	2.2,40	5.9,40	12.5,5	12.5,60

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	50	Sedge spp.	-
Tall shrubs	2	Grass spp.	-
Low shrubs	-	Equisetum spp.	-
Herbaceous vegetation	15	Epilobium spp.	-
Lichens	1	Potentilla palustris	-
Mosses	95	Menyanthes trifoliata	-
Live wood	-	Rubus chamaemorus	-
Litter	80	Cornus canadensis	-
Bare ground	-	Linnaea borealis	10
Charred ground	-		
Standing water	-	% Cover of Low Shrubs:	
Dead moss/lichen	1	Chamaedaphne calyculata	-
Twigs & branches <5cm	75	Ledum palustre	-
Twigs & branches >5cm	6	Andromeda polifolia	-
Vertical stumps	-	Oxycoccus microcarpus	-
Marchantia polymorpha	-	Myrica gale	-
Mushrooms	1	Vaccinium uliginosum	-
Moving water	-		

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	1(5)
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 6-47 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	4	9	8	
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-		7.7,17	26.9,15	30.6,24
Nearest sapling (m, mm)	-	1.0,2	2.2,3	3.1,3	2.8,1

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-	50	Sedge spp.	-	
Tall shrubs	-	1	Grass spp.	-	
Low shrubs	-		Equisetum spp.	-	
Herbaceous vegetation	-	30	Epilobium spp.	-	20
Lichens	-	1	Potentilla palustris	-	
Mosses	-	93	Menyanthes trifoliata	-	
Live wood	-		Rubus chamaemorus	-	
Litter	-	65	Cornus canadensis	-	
Bare ground	-		Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	10	Ledum palustre	-	
Twigs & branches >5cm	-		Andromeda polifolia	-	
Vertical stumps	-	5	Oxycoccus microcarpus	-	
Marchantia polymorpha	-		Myrica gale	-	
Mushrooms	-	1	Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-	1(3)	
Picea glauca (WS)	-		
Betula papyrifera (B)	-	35(61)	10
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 7-23 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	13	5	7	12
Height of Log Debris (cm)	-	15			66
Largest Diameter of Log Debris (cm)	-	6			5
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-				33.1,11
Nearest sapling (m, mm)	-	3.5,5	4.5,10	4.3,5	2.8,5

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-		Sedge spp.	-	
Tall shrubs	-	98	Grass spp.	-	40
Low shrubs	-	7	Equisetum spp.	-	
Herbaceous vegetation	-	40	Epilobium spp.	-	
Lichens	-	1	Potentilla palustris	-	
Mosses	-	50	Menyanthes trifoliata	-	
Live wood	-		Rubus chamaemorus	-	
Litter	-	98	Cornus canadensis	-	
Bare ground	-		Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	1	Ledum palustre	-	
Twigs & branches >5cm	-	3	Andromeda polifolia	-	
Vertical stumps	-	1	Oxycoccus microcarpus	-	
Marchantia polymorpha	-		Myrica gale	-	
Mushrooms	-	1	Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	3(2)
Alnus spp.	-	
Betula nana	-	30(35)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-	2(2)	
Picea glauca (WS)	-		
Betula papyrifera (B)	-		
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 7-24 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	13	20	8	6
Height of Log Debris (cm)	-		23	31	
Largest Diameter of Log Debris (cm)	-		11	9	
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-			19.3,20	30.4,22
Nearest sapling (m, mm)	-	5.5,8		10.1,11	12.1,5

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-	1	Sedge spp.	-	
Tall shrubs	-		Grass spp.	-	
Low shrubs	-		Equisetum spp.	-	
Herbaceous vegetation	-	30	Epilobium spp.	-	30
Lichens	-		Potentilla palustris	-	
Mosses	-	25	Menyanthes trifoliata	-	
Live wood	-	1	Rubus chamaemorus	-	
Litter	-	98	Cornus canadensis	-	
Bare ground	-	3	Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	10	Ledum palustre	-	
Twigs & branches >5cm	-		Andromeda polifolia	-	
Vertical stumps	-		Oxycoccus microcarpus	-	
Marchantia polymorpha	-	5	Myrica gale	-	
Mushrooms	-		Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	1(1)
Betula papyrifera (B)	-	10(38)
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 7-26 *

		Quadrat			
		1	2	3	4
Litter Depth (cm)	-				
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-		27.5		
Nearest dead tree (m, cm)	-			11.0,20	
Nearest sapling (m, mm)	-		21.1,2	22.5,15	

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	-	Sedge spp.	-
Tall shrubs	-	Grass spp.	-
Low shrubs	-	Equisetum spp.	-
Herbaceous vegetation	-	Epilobium spp.	-
Lichens	-	Potentilla palustris	-
Mosses	-	Menyanthes trifoliata	-
Live wood	-	Rubus chamaemorus	-
Litter	-	Cornus canadensis	-
Bare ground	-	Linnaea borealis	-
Charred ground	-		
Standing water	-	% Cover of Low Shrubs:	
Dead moss/lichen	-	Chamaedaphne calyculata	-
Twigs & branches <5cm	-	Ledum palustre	-
Twigs & branches >5cm	-	Andromeda polifolia	-
Vertical stumps	-	Oxycoccus microcarpus	-
Marchantia polymorpha	-	Myrica gale	-
Mushrooms	-	Vaccinium uliginosum	-
Moving water	-		

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 7-28 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	5		4	2
Height of Log Debris (cm)	-	17	17		
Largest Diameter of Log Debris (cm)	-	8	8		
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-	12.8,5	9.2,4		
Nearest sapling (m, mm)	-	2.4,7	6.5,9	2.2,3	1.2,5

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-	25	Sedge spp.	-	
Tall shrubs	-		Grass spp.	-	45
Low shrubs	-	6	Equisetum spp.	-	
Herbaceous vegetation	-	50	Epilobium spp.	-	
Lichens	-	1	Potentilla palustris	-	
Mosses	-	30	Menyanthes trifoliata	-	
Live wood	-	1	Rubus chamaemorus	-	
Litter	-	80	Cornus canadensis	-	
Bare ground	-	1	Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-	20	Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	25	Ledum palustre	-	
Twigs & branches >5cm	-	1	Andromeda polifolia	-	
Vertical stumps	-		Oxycoccus microcarpus	-	
Marchantia polymorpha	-		Myrica gale	-	6
Mushrooms	-	3	Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-	1(1)	
Picea glauca (WS)	-		
Betula papyrifera (B)	-	36(25)	
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 8-22 *

	Quadrat 1	2	3	4
Litter Depth (cm)	8	8		7
Height of Log Debris (cm)	33			26
Largest Diameter of Log Debris (cm)	19			16
Distance to and Diameter of:				
Nearest live tree (m, cm)	9.1,10	11.0,7		
Nearest dead tree (m, cm)	3.5,8	14.3,8	21.0,7	8.1,6
Nearest sapling (m, mm)	13.0,5	3.6,2	5.0,3	9.7,2

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	2	Sedge spp.	
Tall shrubs		Grass spp.	75
Low shrubs		Equisetum spp.	
Herbaceous vegetation	75	Epilobium spp.	
Lichens		Potentilla palustris	
Mosses	1	Menyanthes trifoliata	
Live wood	1	Rubus chamaemorus	
Litter	60	Cornus canadensis	
Bare ground	4	Linnaea borealis	
Charred ground			
Standing water		% Cover of Low Shrubs:	
Dead moss/lichen		Chamaedaphne calyculata	
Twigs & branches <5cm	10	Ledum palustre	
Twigs & branches >5cm	20	Andromeda polifolia	
Vertical stumps		Oxycoccus microcarpus	
Marchantia polymorpha	93	Myrica gale	
Mushrooms		Vaccinium uliginosum	
Moving water			

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	2(1)
Alnus spp.	
Betula nana	
Rosa acicularis	
Viburnum edule	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)		
Picea glauca (WS)	1(4)	
Betula papyrifera (B)	15(5)	
Larix laricina (L)		
Populus tremuloides (P)		

VEGETATION PLOT NUMBER - 8-25 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	3	3	17	11
Height of Log Debris (cm)	-	138		78	185
Largest Diameter of Log Debris (cm)	-	22		21	23
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-		9.8,10		
Nearest sapling (m, mm)	-			22.4,20	

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-	8	Sedge spp.	-	
Tall shrubs	-		Grass spp.	-	
Low shrubs	-		Equisetum spp.	-	
Herbaceous vegetation	-	30	Epilobium spp.	-	25
Lichens	-	1	Potentilla palustris	-	
Mosses	-	85	Menyanthes trifoliata	-	
Live wood	-	1	Rubus chamaemorus	-	
Litter	-	65	Cornus canadensis	-	
Bare ground	-		Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	40	Ledum palustre	-	
Twigs & branches >5cm	-	40	Andromeda polifolia	-	
Vertical stumps	-		Oxycoccus microcarpus	-	
Marchantia polymorpha	-	25	Myrica gale	-	
Mushrooms	-		Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	1(1)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-		
Picea glauca (WS)	-	1(1)	
Betula papyrifera (B)	-	20(46)	
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 8-28 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	8	6	4	14
Height of Log Debris (cm)	-	36	25	23	33
Largest Diameter of Log Debris (cm)	-	7	7	7	8
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-	10.8,6	12.4(7)	2.3(7)	7.2(8)
Nearest sapling (m, mm)	-	10.3,3	6.4(13)	8.5(6)	1.8(2)

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-	6	Sedge spp.	-
Tall shrubs	-	15	Grass spp.	- 45
Low shrubs	-		Equisetum spp.	-
Herbaceous vegetation	-	45	Epilobium spp.	-
Lichens	-		Potentilla palustris	-
Mosses	-	25	Menyanthes trifoliata	-
Live wood	-	1	Rubus chamaemorus	-
Litter	-	85	Cornus canadensis	-
Bare ground	-	3	Linnaea borealis	-
Charred ground	-			
Standing water	-	5	% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	-
Twigs & branches <5cm	-	5	Ledum palustre	-
Twigs & branches >5cm	-	1	Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-	1	Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	10(6)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-	1(3)	
Picea glauca (WS)	-		
Betula papyrifera (B)	-	6(4)	2
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 9-22

	Quadrat 1	2	3	4
Litter Depth (cm) -	10	11	12	8
Height of Log Debris (cm) -				
Largest Diameter of Log Debris (cm) -				
Distance to and Diameter of:				
Nearest live tree (m, cm) -				
Nearest dead tree (m, cm) -		13.7,8	11.0,7	3.7,6
Nearest sapling (m, mm) -				

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-		Sedge spp.	-	
Tall shrubs	-		Grass spp.	-	70
Low shrubs	-		Equisetum spp.	-	
Herbaceous vegetation	-	80	Epilobium spp.	-	
Lichens	-		Potentilla palustris	-	10
Mosses	-	20	Menyanthes trifoliata	-	
Live wood	-		Rubus chamaemorus	-	
Litter	-	98	Cornus canadensis	-	
Bare ground	-		Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	1	Ledum palustre	-	
Twigs & branches >5cm	-		Andromeda polifolia	-	
Vertical stumps	-	1	Oxycoccus microcarpus	-	
Marchantia polymorpha	-		Myrica gale	-	
Mushrooms	-		Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-	1(1)	
Picea glauca (WS)	-		
Betula papyrifera (B)	-	2(2)	
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 10-25 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	8	13	10	10
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-			12.3,7	22.7,8
Nearest dead tree (m, cm)	-				
Nearest sapling (m, mm)	-	16.3,15	21.0,11	11.3,18	22.5,43

% Cover of:		
Live trees	-	
Tall shrubs	-	
Low shrubs	-	
Herbaceous vegetation	-	75
Lichens	-	
Mosses	-	1
Live wood	-	
Litter	-	85
Bare ground	-	
Charred ground	-	
Standing water	-	
Dead moss/lichen	-	1
Twigs & branches <5cm	-	60
Twigs & branches >5cm	-	
Vertical stumps	-	
Marchantia polymorpha	-	
Mushrooms	-	
Moving water	-	1

% Cover of Herbaceous Vegetation:		
Sedge spp.	-	70
Grass spp.	-	
Equisetum spp.	-	
Epilobium spp.	-	
Potentilla palustris	-	
Menyanthes trifoliata	-	
Rubus chamaemorus	-	
Cornus canadensis	-	
Linnaea borealis	-	
% Cover of Low Shrubs:		
Chamaedaphne calyculata	-	
Ledum palustre	-	
Andromeda polifolia	-	
Oxycoccus microcarpus	-	
Myrica gale	-	
Vaccinium uliginosum	-	

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 10-27 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	16	9	12	11
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-			16.2,8	
Nearest dead tree (m, cm)	-	13.0,7			23.2,13
Nearest sapling (m, mm)	-		6.2,22	14.8,38	23.7,38

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-		Sedge spp.	- 20
Tall shrubs	-	45	Grass spp.	- 30
Low shrubs	-		Equisetum spp.	-
Herbaceous vegetation	-	85	Epilobium spp.	-
Lichens	-		Potentilla palustris	- 30
Mosses	-	50	Menyanthes trifoliata	-
Live wood	-		Rubus chamaemorus	-
Litter	-	85	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-	15	% Cover of Low Shrubs:	
Dead moss/lichen	-	1	Chamaedaphne calyculata	-
Twigs & branches <5cm	-		Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	45(162)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 10-28 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	20	15	17	6
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-		22.0,6	17.8,9	
Nearest dead tree (m, cm)	-		28.9,7		
Nearest sapling (m, mm)	-		25.1,30	16.4,16	21.5,60

% Cover of:		
Live trees	-	
Tall shrubs	-	9
Low shrubs	-	
Herbaceous vegetation	-	90
Lichens	-	
Mosses	-	50
Live wood	-	
Litter	-	98
Bare ground	-	
Charred ground	-	
Standing water	-	
Dead moss/lichen	-	
Twigs & branches <5cm	-	
Twigs & branches >5cm	-	
Vertical stumps	-	
Marchantia polymorpha	-	
Mushrooms	-	
Moving water	-	

% Cover of Herbaceous Vegetation:		
Sedge spp.	-	60
Grass spp.	-	25
Equisetum spp.	-	
Epilobium spp.	-	
Potentilla palustris	-	
Menyanthes trifoliata	-	
Rubus chamaemorus	-	
Cornus canadensis	-	
Linnaea borealis	-	

% Cover of Low Shrubs:	
Chamaedaphne calyculata	-
Ledum palustre	-
Andromeda polifolia	-
Oxycoccus microcarpus	-
Myrica gale	-
Vaccinium uliginosum	-

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	25(83)
Alnus spp.	-	
Betula nana	-	1(1)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:	
Picea mariana (BS)	-
Picea glauca (WS)	-
Betula papyrifera (B)	-
Larix laricina (L)	-
Populus tremuloides (P)	-

% Cover of Saplings:

VEGETATION PLOT NUMBER - 10-34 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	4	3	2	2
Height of Log Debris (cm)	-			34	9
Largest Diameter of Log Debris (cm)	-			8	8
Distance to and Diameter of:					
Nearest live tree (m, cm)	-	1.8,7	0.2,27	6.3,16	2.9,21
Nearest dead tree (m, cm)	-	17.4,13	10.7,8	1.9,9	
Nearest sapling (m, mm)	-	4.7,48	10.8,53	10.9,53	5.0,43

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-	40	Sedge spp.	-
Tall shrubs	-	95	Grass spp.	-
Low shrubs	-		Equisetum spp.	- 10
Herbaceous vegetation	-	25	Epilobium spp.	-
Lichens	-		Potentilla palustris	-
Mosses	-	80	Menyanthes trifoliata	-
Live wood	-		Rubus chamaemorus	-
Litter	-	85	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-		% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	-
Twigs & branches <5cm	-	30	Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-	1	Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	75(11)
Betula nana	-	
Rosa acicularis	-	2(8)
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 10-41 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	10	5		5
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-	27.4,14	15.8,10	12.3,7	10.4,11
Nearest dead tree (m, cm)	-	22.5,18	24.5,8	25.0,8	10.4,11
Nearest sapling (m, mm)	-	5.8,28	5.4,2	5.6,5	4.1,7

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-		Sedge spp.	- 50
Tall shrubs	-	10	Grass spp.	-
Low shrubs	-		Equisetum spp.	- 25
Herbaceous vegetation	-	75	Epilobium spp.	-
Lichens	-		Potentilla palustris	-
Mosses	-	95	Menyanthes trifoliata	-
Live wood	-		Rubus chamaemorus	-
Litter	-	40	Cornus canadensis	-
Bare ground	-	3	Linnaea borealis	-
Charred ground	-			
Standing water	-		% Cover of Low Shrubs:	
Dead moss/lichen	-	1	Chamaedaphne calyculata	-
Twigs & branches <5cm	-		Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	20 (138)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-		
Picea glauca (WS)	-		
Betula papyrifera (B)	-		
Larix laricina (L)	-	1 (1)	
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 10-42 *

	Quadrat 1	2	3	4
Litter Depth (cm)	5	7	12	10
Height of Log Debris (cm)				
Largest Diameter of Log Debris (cm)				
Distance to and Diameter of:				
Nearest live tree (m, cm)	23.6,7	28.4,9	16.1,8	20.9,23
Nearest dead tree (m, cm)			7.9,12	8.9,8
Nearest sapling (m, mm)	6.4,6	23.5,40	3.5,20	5.4,3

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	-	Sedge spp.	- 85
Tall shrubs	-	Grass spp.	-
Low shrubs	-	Equisetum spp.	-
Herbaceous vegetation	- 95	Epilobium spp.	-
Lichens	-	Potentilla palustris	- 75
Mosses	- 90	Menyanthes trifoliata	-
Live wood	-	Rubus chamaemorus	-
Litter	- 90	Cornus canadensis	-
Bare ground	-	Linnaea borealis	-
Charred ground	-		
Standing water	- 10	% Cover of Low Shrubs:	
Dead moss/lichen	-	Chamaedaphne calyculata	-
Twigs & branches <5cm	-	Ledum palustre	-
Twigs & branches >5cm	-	Andromeda polifolia	-
Vertical stumps	-	Oxycoccus microcarpus	-
Marchantia polymorpha	-	Myrica gale	-
Mushrooms	-	Vaccinium uliginosum	-
Moving water	-		

% Cover and (Number of Stems) of Tall Shrubs:

Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 10-49 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	13	5	8	4
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-	7.2,8			
Nearest dead tree (m, cm)	-	33.2,11			
Nearest sapling (m, mm)	-	2.5,11	2.4,3	2.2,28	3.4,4

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-		Sedge spp.	-	75
Tall shrubs	-	9	Grass spp.	-	
Low shrubs	-	20	Equisetum spp.	-	
Herbaceous vegetation	-	75	Epilobium spp.	-	
Lichens	-		Potentilla palustris	-	
Mosses	-	98	Menyanthes trifoliata	-	
Live wood	-		Rubus chamaemorus	-	
Litter	-	93	Cornus canadensis	-	
Bare ground	-		Linnaea borealis	-	
Charred ground	-				
Standing water	-	6	% Cover of Low Shrubs:		
Dead moss/lichen	-	1	Chamaedaphne calyculata	-	
Twigs & branches <5cm	-		Ledum palustre	-	
Twigs & branches >5cm	-		Andromeda polifolia	-	15
Vertical stumps	-		Oxycoccus microcarpus	-	
Marchantia polymorpha	-		Myrica gale	-	
Mushrooms	-	1	Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	1(3)
Alnus spp.	-	
Betula nana	-	30(96)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 10-52 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	7	6	6	5
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-	17.7,7			4.7,9
Nearest dead tree (m, cm)	-				
Nearest sapling (m, mm)	-	2.3,21	2.9,50	1.9,3	2.1,17

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-	2	Sedge spp.	- 60
Tall shrubs	-	60	Grass spp.	-
Low shrubs	-	20	Equisetum spp.	- 20
Herbaceous vegetation	-	90	Epilobium spp.	-
Lichens	-	1	Potentilla palustris	-
Mosses	-	96	Menyanthes trifoliata	-
Live wood	-	1	Rubus chamaemorus	-
Litter	-	90	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-	4	% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	- 10
Twigs & branches <5cm	-	6	Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	- 10
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	
Betula nana	-	45(85)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	1(2)
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 11-24 *

	Quadrat 1	2	3	4
Litter Depth (cm)	6	3	5	7
Height of Log Debris (cm)	59	25	45	38
Largest Diameter of Log Debris (cm)	9	7	7	7
Distance to and Diameter of:				
Nearest live tree (m, cm)				
Nearest dead tree (m, cm)	3.3,9	20.8,10	20.4,10	20.5,8
Nearest sapling (m, mm)	0.9,3	1.8,5	2.2,6	3.4,7

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	10	Sedge spp.	-
Tall shrubs	15	Grass spp.	30
Low shrubs	-	Equisetum spp.	10
Herbaceous vegetation	45	Epilobium spp.	-
Lichens	1	Potentilla palustris	-
Mosses	90	Menyanthes trifoliata	-
Live wood	1	Rubus chamaemorus	-
Litter	90	Cornus canadensis	-
Bare ground	-	Linnaea borealis	-
Charred ground	-		
Standing water	-	% Cover of Low Shrubs:	
Dead moss/lichen	1	Chamaedaphne calyculata	-
Twigs & branches <5cm	25	Ledum palustre	-
Twigs & branches >5cm	15	Andromeda polifolia	-
Vertical stumps	-	Oxycoccus microcarpus	-
Marchantia polymorpha	-	Myrica gale	-
Mushrooms	1	Vaccinium uliginosum	-
Moving water	-		

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	15(12)
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	1(4)	
Picea glauca (WS)	-	
Betula papyrifera (B)	10(15)	2
Larix laricina (L)	-	
Populus tremuloides (P)	1(1)	

VEGETATION PLOT NUMBER - 11-35 *

	Quadrat 1	2	3	4
Litter Depth (cm)	6	9	3	9
Height of Log Debris (cm)	19			24
Largest Diameter of Log Debris (cm)	14			9
Distance to and Diameter of:				
Nearest live tree (m, cm)	5.4,8	4.0,39	6.2,33	0.6,8
Nearest dead tree (m, cm)	14.2,12		7.2,28	6.9,28
Nearest sapling (m, mm)	9.5,12	13.1,60	16.5,42	1.0,55

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	90	Sedge spp.	-
Tall shrubs	25	Grass spp.	-
Low shrubs	10	Equisetum spp.	20
Herbaceous vegetation	20	Epilobium spp.	-
Lichens	1	Potentilla palustris	-
Mosses	97	Menyanthes trifoliata	-
Live wood	-	Rubus chamaemorus	-
Litter	30	Cornus canadensis	-
Bare ground	-	Linnaea borealis	-
Charred ground	-		
Standing water	-	% Cover of Low Shrubs:	
Dead moss/lichen	-	Chamaedaphne calyculata	-
Twigs & branches <5cm	4	Ledum palustre	-
Twigs & branches >5cm	10	Andromeda polifolia	-
Vertical stumps	-	Oxycoccus microcarpus	10
Marchantia polymorpha	-	Myrica gale	-
Mushrooms	1	Vaccinium uliginosum	-
Moving water	-		

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	25(19)
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	50
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 11-39 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-			1	3
Height of Log Debris (cm)	-	35	42		
Largest Diameter of Log Debris (cm)	-	7	8		
Distance to and Diameter of:					
Nearest live tree (m, cm)	-	5.9,24	5.0,18	3.4,30	3.1,14
Nearest dead tree (m, cm)	-		10.0,10	24.9,12	26.2,18
Nearest sapling (m, mm)	-	3.4,16	4.6,20	7.2,20	1.2,6

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-	20	Sedge spp.	-	
Tall shrubs	-	65	Grass spp.	-	
Low shrubs	-		Equisetum spp.	-	10
Herbaceous vegetation	-	20	Epilobium spp.	-	
Lichens	-	2	Potentilla palustris	-	
Mosses	-	30	Menyanthes trifoliata	-	
Live wood	-		Rubus chamaemorus	-	
Litter	-	90	Cornus canadensis	-	10
Bare ground	-		Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	8	Ledum palustre	-	
Twigs & branches >5cm	-	4	Andromeda polifolia	-	
Vertical stumps	-	6	Oxycoccus microcarpus	-	
Marchantia polymorpha	-		Myrica gale	-	
Mushrooms	-	2	Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	25(1)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	45(38)
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	2
Betula papyrifera (B)	-	1(1)
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 11-42 *

	Quadrat 1	2	3	4
Litter Depth (cm)	3	1	11	1
Height of Log Debris (cm)				
Largest Diameter of Log Debris (cm)				
Distance to and Diameter of:				
Nearest live tree (m, cm)	3.4,10	2.8,35	3.2,10	7.1,10
Nearest dead tree (m, cm)		9.8,9		4.6,12
Nearest sapling (m, mm)	1.6,10		7.1,18	4.6,12

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	2	Sedge spp.	
Tall shrubs	98	Grass spp.	10
Low shrubs		Equisetum spp.	60
Herbaceous vegetation	75	Epilobium spp.	
Lichens	1	Potentilla palustris	
Mosses	6	Menyanthes trifoliata	
Live wood		Rubus chamaemorus	
Litter	90	Cornus canadensis	
Bare ground	2	Linnaea borealis	
Charred ground			
Standing water		% Cover of Low Shrubs:	
Dead moss/lichen		Chamaedaphne calyculata	
Twigs & branches <5cm	30	Ledum palustre	
Twigs & branches >5cm		Andromeda polifolia	
Vertical stumps	4	Oxycoccus microcarpus	
Marchantia polymorpha		Myrica gale	
Mushrooms	1	Vaccinium uliginosum	
Moving water			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.		
Alnus spp.		50(26)
Betula nana		
Rosa acicularis		50(49)
Viburnum edule		

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)		
Picea glauca (WS)		
Betula papyrifera (B)		
Larix laricina (L)		
Populus tremuloides (P)		

VEGETATION PLOT NUMBER - 11-43 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	11	10	13	27
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-	14.4,8	6.8,7	10.4,7	
Nearest dead tree (m, cm)	-		19.7,12	33.2,11	
Nearest sapling (m, mm)	-	10.5,11	5.2,13	4.1,6	

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-	1	Sedge spp.	- 10
Tall shrubs	-		Grass spp.	- 70
Low shrubs	-	4	Equisetum spp.	-
Herbaceous vegetation	-	80	Epilobium spp.	-
Lichens	-		Potentilla palustris	-
Mosses	-	90	Menyanthes trifoliata	-
Live wood	-		Rubus chamaemorus	-
Litter	-	95	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-	1	% Cover of Low Shrubs:	
Dead moss/lichen	-	1	Chamaedaphne calyculata	-
Twigs & branches <5cm	-		Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	1(8)
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 11-45 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	14	7	7	6
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-				
Nearest sapling (m, mm)	-				32.5,7

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-		Sedge spp.	-	80
Tall shrubs	-		Grass spp.	-	
Low shrubs	-	8	Equisetum spp.	-	
Herbaceous vegetation	-	90	Epilobium spp.	-	
Lichens	-		Potentilla palustris	-	
Mosses	-	98	Menyanthes trifoliata	-	
Live wood	-		Rubus chamaemorus	-	
Litter	-	98	Cornus canadensis	-	
Bare ground	-		Linnaea borealis	-	
Charred ground	-				
Standing water	-	15	% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-		Ledum palustre	-	
Twigs & branches >5cm	-		Andromeda polifolia	-	10
Vertical stumps	-		Oxycoccus microcarpus	-	
Marchantia polymorpha	-		Myrica gale	-	
Mushrooms	-		Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	2(31)
Alnus spp.	-	
Betula nana	-	1(5)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 11-53 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	6	6	5	5
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-		9.1,7	25.6,9	
Nearest dead tree (m, cm)	-				
Nearest sapling (m, mm)	-	6.1,60	5.1,60	4.4,8	4.5,40

% Cover of:		
Live trees	-	1
Tall shrubs	-	1
Low shrubs	-	10
Herbaceous vegetation	-	75
Lichens	-	
Mosses	-	95
Live wood	-	1
Litter	-	90
Bare ground	-	
Charred ground	-	
Standing water	-	25
Dead moss/lichen	-	
Twigs & branches <5cm	-	
Twigs & branches >5cm	-	
Vertical stumps	-	
Marchantia polymorpha	-	
Mushrooms	-	
Moving water	-	

% Cover of Herbaceous Vegetation:		
Sedge spp.	-	65
Grass spp.	-	
Equisetum spp.	-	
Epilobium spp.	-	
Potentilla palustris	-	
Menyanthes trifoliata	-	
Rubus chamaemorus	-	
Cornus canadensis	-	
Linnaea borealis	-	
% Cover of Low Shrubs:		
Chamaedaphne calyculata	-	
Ledum palustre	-	
Andromeda polifolia	-	
Oxycoccus microcarpus	-	
Myrica gale	-	
Vaccinium uliginosum	-	

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	
Betula nana	-	1(1)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	1(3)
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 12-23 *

	Quadrat 1	2	3	4
Litter Depth (cm)	17	9	14	12
Height of Log Debris (cm)	21	22	25	31
Largest Diameter of Log Debris (cm)	11	10	15	17
Distance to and Diameter of:				
Nearest live tree (m, cm)				
Nearest dead tree (m, cm)	9.3,7	11.7,9	17.2,8	8.7,10
Nearest sapling (m, mm)	8.0,2	16.3,3	3.8,3	7.4,4

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	2	Sedge spp.	-
Tall shrubs	-	Grass spp.	15
Low shrubs	-	Equisetum spp.	-
Herbaceous vegetation	30	Epilobium spp.	15
Lichens	1	Potentilla palustris	-
Mosses	90	Menyanthes trifoliata	-
Live wood	1	Rubus chamaemorus	-
Litter	75	Cornus canadensis	-
Bare ground	1	Linnaea borealis	-
Charred ground	-		
Standing water	-	% Cover of Low Shrubs:	
Dead moss/lichen	-	Chamaedaphne calyculata	-
Twigs & branches <5cm	35	Ledum palustre	-
Twigs & branches >5cm	15	Andromeda polifolia	-
Vertical stumps	-	Oxycoccus microcarpus	-
Marchantia polymorpha	7	Myrica gale	-
Mushrooms	1	Vaccinium uliginosum	-
Moving water	-		

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	1(1)	
Picea glauca (WS)	-	
Betula papyrifera (B)	2(10)	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 12-30 *

	Quadrat 1	2	3	4
Litter Depth (cm)	17	18	14	19
Height of Log Debris (cm)			22	25
Largest Diameter of Log Debris (cm)			13	10
Distance to and Diameter of:				
Nearest live tree (m, cm)		10.9,8		18.5,8
Nearest dead tree (m, cm)		7.4,7	17.1,11	33.0,8
Nearest sapling (m, mm)	2.1,4	2.0,5	28.7,28	8.8,3

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	-	Sedge spp.	- 80
Tall shrubs	-	Grass spp.	-
Low shrubs	- 70	Equisetum spp.	- 10
Herbaceous vegetation	- 90	Epilobium spp.	-
Lichens	- 1	Potentilla palustris	-
Mosses	- 80	Menyanthes trifoliata	-
Live wood	-	Rubus chamaemorus	-
Litter	- 90	Cornus canadensis	-
Bare ground	-	Linnaea borealis	-
Charred ground	-		
Standing water	- 6	% Cover of Low Shrubs:	
Dead moss/lichen	- 1	Chamaedaphne calyculata	- 70
Twigs & branches <5cm	-	Ledum palustre	-
Twigs & branches >5cm	- 2	Andromeda polifolia	-
Vertical stumps	- 5	Oxycoccus microcarpus	-
Marchantia polymorpha	-	Myrica gale	-
Mushrooms	-	Vaccinium uliginosum	-
Moving water	-		

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	
Betula nana	-	1(1)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 12-34 *

	Quadrat			
	1	2	3	4
Litter Depth (cm)	2	2	3	4
Height of Log Debris (cm)		10		
Largest Diameter of Log Debris (cm)		5		
Distance to and Diameter of:				
Nearest live tree (m, cm)	2.9,25	4.2,18	1.1,13	2.8,20
Nearest dead tree (m, cm)	7.9,12	23.0,30	14.5,15	
Nearest sapling (m, mm)	4.2,48	2.0,40	3.9,28	5.5,4

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	80	Sedge spp.	-
Tall shrubs	60	Grass spp.	-
Low shrubs	-	Equisetum spp.	-
Herbaceous vegetation	30	Epilobium spp.	-
Lichens	-	Potentilla palustris	-
Mosses	95	Menyanthes trifoliata	-
Live wood	-	Rubus chamaemorus	-
Litter	95	Cornus canadensis	15
Bare ground	-	Linnaea borealis	-
Charred ground	-		
Standing water	-	% Cover of Low Shrubs:	
Dead moss/lichen	4	Chamaedaphne calyculata	-
Twigs & branches <5cm	5	Ledum palustre	-
Twigs & branches >5cm	-	Andromeda polifolia	-
Vertical stumps	-	Oxycoccus microcarpus	-
Marchantia polymorpha	-	Myrica gale	-
Mushrooms	1	Vaccinium uliginosum	-
Moving water	-		

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	50(4)
Betula nana	-	
Rosa acicularis	-	4(7)
Viburnum edule	-	2(5)

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 12-35 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	4	10	17	5
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-				
Nearest sapling (m, mm)	-				

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-		Sedge spp.	- 50
Tall shrubs	-	25	Grass spp.	-
Low shrubs	-	15	Equisetum spp.	- 20
Herbaceous vegetation	-	80	Epilobium spp.	-
Lichens	-		Potentilla palustris	-
Mosses	-	15	Menyanthes trifoliata	-
Live wood	-		Rubus chamaemorus	-
Litter	-	90	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-	7	% Cover of Low Shrubs:	
Dead moss/lichen	-	3	Chamaedaphne calyculata	- 15
Twigs & branches <5cm	-		Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	40(75)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 12-36 *

	Quadrat			
	1	2	3	4
Litter Depth (cm) -	4	10	17	5
Height of Log Debris (cm) -				
Largest Diameter of Log Debris (cm) -				
Distance to and Diameter of:				
Nearest live tree (m, cm) -				
Nearest dead tree (m, cm) -				
Nearest sapling (m, mm) -				

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-		Sedge spp.	- 30
Tall shrubs	-		Grass spp.	- 40
Low shrubs	-		Equisetum spp.	-
Herbaceous vegetation	-	80	Epilobium spp.	-
Lichens	-		Potentilla palustris	- 10
Mosses	-	80	Menyanthes trifoliata	-
Live wood	-		Rubus chamaemorus	-
Litter	-	80	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-	8	% Cover of Low Shrubs:	
Dead moss/lichen	-	2	Chamaedaphne calyculata	-
Twigs & branches <5cm	-		Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:

Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 12-42 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	23	16	25	12
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-	7.9,10			6.8,7
Nearest dead tree (m, cm)	-				
Nearest sapling (m, mm)	-	4.9,3	8.5,13	16.7,17	6.8,12

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-		Sedge spp.	- 93
Tall shrubs	-		Grass spp.	-
Low shrubs	-		Equisetum spp.	-
Herbaceous vegetation	-	95	Epilobium spp.	-
Lichens	-		Potentilla palustris	-
Mosses	-	25	Menyanthes trifoliata	-
Live wood	-		Rubus chamaemorus	-
Litter	-	95	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-	99	% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	-
Twigs & branches <5cm	-		Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:

Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 12-48 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	11	7	7	4
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)		-22.9,11	16.8,8		12.0,8
Nearest dead tree (m, cm)		-10.0,10	13.3,11	9.6,12	9.0,8
Nearest sapling (m, mm)		- 0.5,15	2.6,22	0.6,10	1.1,4

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-	25	Sedge spp.	- 90
Tall shrubs	-	25	Grass spp.	-
Low shrubs	-	25	Equisetum spp.	-
Herbaceous vegetation	-	90	Epilobium spp.	-
Lichens	-	1	Potentilla palustris	-
Mosses	-	95	Menyanthes trifoliata	-
Live wood	-	1	Rubus chamaemorus	-
Litter	-	85	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-	6	% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	-
Twigs & branches <5cm	-	1	Ledum palustre	- 20
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	10(52)
Alnus spp.	-	
Betula nana	-	50(51)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 12-51 *

	Quadrat 1	2	3	4
Litter Depth (cm) -	7	2	3	8
Height of Log Debris (cm) -				
Largest Diameter of Log Debris (cm) -				
Distance to and Diameter of:				
Nearest live tree (m, cm) -	2.4,9	2.3,7	15.0,7	3.6,8
Nearest dead tree (m, cm) -				
Nearest sapling (m, mm) -	2.3,30	0.6,37	1.5,18	2.4,16

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-	65	Sedge spp.	-
Tall shrubs	-	25	Grass spp.	-
Low shrubs	-	60	Equisetum spp.	- 10
Herbaceous vegetation	-	25	Epilobium spp.	-
Lichens	-	1	Potentilla palustris	-
Mosses	-	95	Menyanthes trifoliata	-
Live wood	-		Rubus chamaemorus	-
Litter	-	95	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-	4	% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	- 50
Twigs & branches <5cm	-	20	Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-	1	Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	10(3)
Betula nana	-	50(31)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 13-25 *

		Quadrat			
		1	2	3	4
Litter Depth (cm)	-	4	4	2	3
Height of Log Debris (cm)	-			4	
Largest Diameter of Log Debris (cm)	-			6	
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-	17.5,12		28.0,25	
Nearest sapling (m, mm)	-	4.9,9		14.0,3	10.9,4

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-		Sedge spp.	-	
Tall shrubs	-	30	Grass spp.	-	50
Low shrubs	-		Equisetum spp.	-	40
Herbaceous vegetation	-	80	Epilobium spp.	-	
Lichens	-		Potentilla palustris	-	
Mosses	-	5	Menyanthes trifoliata	-	
Live wood	-		Rubus chamaemorus	-	
Litter	-	75	Cornus canadensis	-	
Bare ground	-	25	Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	1	Ledum palustre	-	
Twigs & branches >5cm	-		Andromeda polifolia	-	
Vertical stumps	-	1	Oxycoccus microcarpus	-	
Marchantia polymorpha	-		Myrica gale	-	
Mushrooms	-		Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	20(31)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	1(2)
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 14-25 *

	Quadrat 1	2	3	4
Litter Depth (cm)	6		5	6
Height of Log Debris (cm)	41	56	34	41
Largest Diameter of Log Debris (cm)	12	16	16	11
Distance to and Diameter of:				
Nearest live tree (m, cm)				
Nearest dead tree (m, cm)	14.4,11	9.0,13	11.0,15	7.9,10
Nearest sapling (m, mm)	4.3,5	3.6,4	3.2,5	7.1,7

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	2	Sedge spp.	
Tall shrubs		Grass spp.	30
Low shrubs		Equisetum spp.	15
Herbaceous vegetation	65	Epilobium spp.	20
Lichens	1	Potentilla palustris	
Mosses	90	Menyanthes trifoliata	
Live wood	1	Rubus chamaemorus	
Litter	60	Cornus canadensis	
Bare ground	1	Linnaea borealis	
Charred ground	3		
Standing water		% Cover of Low Shrubs:	
Dead moss/lichen		Chamaedaphne calyculata	
Twigs & branches <5cm	15	Ledum palustre	
Twigs & branches >5cm	15	Andromeda polifolia	
Vertical stumps		Oxycoccus microcarpus	
Marchantia polymorpha		Myrica gale	
Mushrooms		Vaccinium uliginosum	
Moving water			

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	
Alnus spp.	
Betula nana	
Rosa acicularis	
Viburnum edule	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)		
Picea glauca (WS)		
Betula papyrifera (B)		1(1)
Larix laricina (L)		
Populus tremuloides (P)		

VEGETATION PLOT NUMBER - 14-28 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	5	10		9
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-	7.0,19	7.5,14		
Nearest sapling (m, mm)	-		17.8,10		

% Cover of:		
Live trees	-	
Tall shrubs	-	70
Low shrubs	-	
Herbaceous vegetation	-	95
Lichens	-	
Mosses	-	
Live wood	-	
Litter	-	85
Bare ground	-	15
Charred ground	-	
Standing water	-	
Dead moss/lichen	-	
Twigs & branches <5cm	-	2
Twigs & branches >5cm	-	
Vertical stumps	-	
Marchantia polymorpha	-	
Mushrooms	-	
Moving water	-	

% Cover of Herbaceous Vegetation:		
Sedge spp.	-	
Grass spp.	-	80
Equisetum spp.	-	15
Epilobium spp.	-	
Potentilla palustris	-	
Menyanthes trifoliata	-	
Rubus chamaemorus	-	
Cornus canadensis	-	
Linnaea borealis	-	

% Cover of Low Shrubs:	
Chamaedaphne calyculata	-
Ledum palustre	-
Andromeda polifolia	-
Oxycoccus microcarpus	-
Myrica gale	-
Vaccinium uliginosum	-

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	10(2)
Alnus spp.	-	40(0)
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:	
Picea mariana (BS)	-
Picea glauca (WS)	-
Betula papyrifera (B)	-
Larix laricina (L)	-
Populus tremuloides (P)	-

% Cover of Saplings:

VEGETATION PLOT NUMBER - 16-27 *

	Quadrat 1	2	3	4
Litter Depth (cm) -	12	6	7	11
Height of Log Debris (cm) -				
Largest Diameter of Log Debris (cm) -				
Distance to and Diameter of:				
Nearest live tree (m, cm) -				
Nearest dead tree (m, cm) -				
Nearest sapling (m, mm) -	3.9,8	2.5,6	5.2,20	4.9,18

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	-	Sedge spp.	-
Tall shrubs	- 1	Grass spp.	- 60
Low shrubs	- 10	Equisetum spp.	-
Herbaceous vegetation	- 80	Epilobium spp.	-
Lichens	-	Potentilla palustris	- 15
Mosses	- 98	Menyanthes trifoliata	-
Live wood	-	Rubus chamaemorus	-
Litter	- 90	Cornus canadensis	-
Bare ground	-	Linnaea borealis	-
Charred ground	-		
Standing water	- 1	% Cover of Low Shrubs:	
Dead moss/lichen	-	Chamaedaphne calyculata	-
Twigs & branches <5cm	-	Ledum palustre	-
Twigs & branches >5cm	-	Andromeda polifolia	- 10
Vertical stumps	-	Oxycoccus microcarpus	-
Marchantia polymorpha	-	Myrica gale	-
Mushrooms	-	Vaccinium uliginosum	-
Moving water	-		

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	1(13)
Alnus spp.	-	
Betula nana	-	2(15)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 17-20

		Quadrat 1	2	3	4
Litter Depth (cm)	-	6	1	7	5
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-	18.1,8		8.9,9	
Nearest sapling (m, mm)	-	0.7,3	4.9,5	5.1,6	4.5,7

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-	15	Sedge spp.	- 15
Tall shrubs	-	1	Grass spp.	- 30
Low shrubs	-	15	Equisetum spp.	-
Herbaceous vegetation	-	50	Epilobium spp.	-
Lichens	-		Potentilla palustris	-
Mosses	-	20	Menyanthes trifoliata	-
Live wood	-	1	Rubus chamaemorus	-
Litter	-	90	Cornus canadensis	-
Bare ground	-	6	Linnaea borealis	-
Charred ground	-			
Standing water	-	3	% Cover of Low Shrubs:	
Dead moss/lichen	-	2	Chamaedaphne calyculata	-
Twigs & branches <5cm	-	1	Ledum palustre	- 10
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-	2	Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-	1	Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	4(6)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-	15(24)	
Picea glauca (WS)	-		
Betula papyrifera (B)	-	1(3)	15
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 17-21

		Quadrat 1	2	3	4
Litter Depth (cm)	-		7	12	21
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-		29.2,8	27.8,10	14.6,11
Nearest sapling (m, mm)	-	13.5,20	12.7,5	23.4,10	

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-		Sedge spp.	- 15
Tall shrubs	-		Grass spp.	-
Low shrubs	-		Equisetum spp.	-
Herbaceous vegetation	-	90	Epilobium spp.	-
Lichens	-		Potentilla palustris	- 30
Mosses	-	40	Menyanthes trifoliata	- 10
Live wood	-		Rubus chamaemorus	-
Litter	-	50	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-	40	% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	-
Twigs & branches <5cm	-		Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 17-22

		Quadrat 1	2	3	4
Litter Depth (cm)	-	13		3	12
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				15.1,7
Nearest dead tree (m, cm)	-	31.8,8			
Nearest sapling (m, mm)	-	0.7,12	2.3,4	1.9,6	1.0,20

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-	50	Sedge spp.	-	10
Tall shrubs	-	10	Grass spp.	-	
Low shrubs	-	20	Equisetum spp.	-	50
Herbaceous vegetation	-	65	Epilobium spp.	-	
Lichens	-		Potentilla palustris	-	
Mosses	-	80	Menyanthes trifoliata	-	
Live wood	-	1	Rubus chamaemorus	-	
Litter	-	40	Cornus canadensis	-	
Bare ground	-	2	Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	1	Ledum palustre	-	15
Twigs & branches >5cm	-		Andromeda polifolia	-	
Vertical stumps	-		Oxycoccus microcarpus	-	
Marchantia polymorpha	-		Myrica gale	-	
Mushrooms	-	1	Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	
Betula nana	-	15(12)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-	10(3)	10
Picea glauca (WS)	-		
Betula papyrifera (B)	-	2(6)	
Larix laricina (L)	-	3(2)	25
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 17-28

		Quadrat 1	2	3	4
Litter Depth (cm)	-	7	7	7	7
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-		19.0,7	13.8,8	20.5,11
Nearest dead tree (m, cm)	-	3.5,7	6.5,8	8.5,7	5.4,10
Nearest sapling (m, mm)	-	19.1,10	16.0,13	14.3,20	16.7,2

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-		Sedge spp.	- 90
Tall shrubs	-		Grass spp.	-
Low shrubs	-		Equisetum spp.	- 10
Herbaceous vegetation	-	99	Epilobium spp.	-
Lichens	-		Potentilla palustris	-
Mosses	-		Menyanthes trifoliata	-
Live wood	-		Rubus chamaemorus	-
Litter	-	40	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-	99	% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	-
Twigs & branches <5cm	-		Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	1(1)
Alnus spp.	-	
Betula nana	-	10(1)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 17-32

	Quadrat 1	2	3	4
Litter Depth (cm)	3			2
Height of Log Debris (cm)	12			25
Largest Diameter of Log Debris (cm)	6			6
Distance to and Diameter of:				
Nearest live tree (m, cm)				
Nearest dead tree (m, cm)	20.0,8	20.0,8	15.5,7	13.2,10
Nearest sapling (m, mm)	3.0,2	3.4,4	2.4,2	8.3,5

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	6	Sedge spp.	-
Tall shrubs	15	Grass spp.	-
Low shrubs	80	Equisetum spp.	-
Herbaceous vegetation	15	Epilobium spp.	-
Lichens	-	Potentilla palustris	-
Mosses	60	Menyanthes trifoliata	-
Live wood	1	Rubus chamaemorus	10
Litter	15	Cornus canadensis	-
Bare ground	-	Linnaea borealis	-
Charred ground	2		
Standing water	-	% Cover of Low Shrubs:	
Dead moss/lichen	10	Chamaedaphne calyculata	20
Twigs & branches <5cm	20	Ledum palustre	40
Twigs & branches >5cm	2	Andromeda polifolia	-
Vertical stumps	-	Oxycoccus microcarpus	20
Marchantia polymorpha	-	Myrica gale	-
Mushrooms	1	Vaccinium uliginosum	-
Moving water	-		

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	
Betula nana	-	20(24)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	3(44)
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 17-34

		Quadrat 1	2	3	4
Litter Depth (cm)	-		3	19	19
Height of Log Debris (cm)	-	78		6	45
Largest Diameter of Log Debris (cm)	-	8		8	9
Distance to and Diameter of:					
Nearest live tree (m, cm)	-	26.9,9	20.2,11	18.5,6	5.8,14
Nearest dead tree (m, cm)	-	21.5,10	24.6,14	21.1,8	11.9,10
Nearest sapling (m, mm)	-	0.9,1	0.5,2	2.2,2	1.6,2

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-	50	Sedge spp.	-
Tall shrubs	-	15	Grass spp.	-
Low shrubs	-	2	Equisetum spp.	-
Herbaceous vegetation	-	15	Epilobium spp.	-
Lichens	-	1	Potentilla palustris	-
Mosses	-	40	Menyanthes trifoliata	-
Live wood	-	1	Rubus chamaemorus	-
Litter	-	45	Cornus canadensis	-
Bare ground	-	5	Linnaea borealis	-
Charred ground	-			
Standing water	-		% Cover of Low Shrubs:	
Dead moss/lichen	-	5	Chamaedaphne calyculata	-
Twigs & branches <5cm	-	5	Ledum palustre	-
Twigs & branches >5cm	-	2	Andromeda polifolia	-
Vertical stumps	-	40	Oxycoccus microcarpus	-
Marchantia polymorpha	-	8	Myrica gale	-
Mushrooms	-	1	Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	1(1)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	20(14)
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-		
Picea glauca (WS)	-	2(18)	
Betula papyrifera (B)	-	25(210)	6
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 17-45 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	2	1	1	
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-	8.2,18	4.2,33	0.9,15	4.5,23
Nearest dead tree (m, cm)	-	14.0,20	17.0,21	6.6,14	11.0,45
Nearest sapling (m, mm)	-	16.2,2	7.5,62	8.1,4	14.8,30

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-	40	Sedge spp.	-	
Tall shrubs	-	10	Grass spp.	-	
Low shrubs	-		Equisetum spp.	-	60
Herbaceous vegetation	-	75	Epilobium spp.	-	
Lichens	-		Potentilla palustris	-	
Mosses	-	8	Menyanthes trifoliata	-	
Live wood	-		Rubus chamaemorus	-	
Litter	-	2	Cornus canadensis	-	
Bare ground	-		Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	5	Ledum palustre	-	
Twigs & branches >5cm	-		Andromeda polifolia	-	
Vertical stumps	-		Oxycoccus microcarpus	-	
Marchantia polymorpha	-		Myrica gale	-	
Mushrooms	-		Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	15(20)
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 17-47 *

	Quadrat 1	2	3	4
Litter Depth (cm)	16	9	7	8
Height of Log Debris (cm)				
Largest Diameter of Log Debris (cm)				
Distance to and Diameter of:				
Nearest live tree (m, cm)	10.0,13	13.0,10		25.1,8
Nearest dead tree (m, cm)	23.0,16	20.0,8	21.0,10	22.1,8
Nearest sapling (m, mm)	23.0,60	11.4,6	11.6,2	11.5,2

% Cover of:		% Cover of Herbaceous Vegetation:	
Live trees	7	Sedge spp.	
Tall shrubs	25	Grass spp.	90
Low shrubs	9	Equisetum spp.	
Herbaceous vegetation	95	Epilobium spp.	
Lichens		Potentilla palustris	
Mosses	3	Menyanthes trifoliata	
Live wood	1	Rubus chamaemorus	
Litter	98	Cornus canadensis	
Bare ground		Linnaea borealis	
Charred ground			
Standing water	1	% Cover of Low Shrubs:	
Dead moss/lichen		Chamaedaphne calyculata	
Twigs & branches <5cm		Ledum palustre	
Twigs & branches >5cm		Andromeda polifolia	
Vertical stumps		Oxycoccus microcarpus	
Marchantia polymorpha	2	Myrica gale	
Mushrooms	1	Vaccinium uliginosum	
Moving water			

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	3(15)
Alnus spp.	25(10)
Betula nana	2(5)
Rosa acicularis	
Viburnum edule	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)		
Picea glauca (WS)		
Betula papyrifera (B)	25(59)	
Larix laricina (L)		
Populus tremuloides (P)		

VEGETATION PLOT NUMBER - 18-24 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-				
Height of Log Debris (cm)	-	18	9	11	
Largest Diameter of Log Debris (cm)	-	11	7	14	
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-	28.6,10	33.2,24		20.3,8
Nearest sapling (m, mm)	-	4.6,3	5.3,5	3.1,10	3.3,3

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-	20	Sedge spp.	-	
Tall shrubs	-	1	Grass spp.	-	
Low shrubs	-		Equisetum spp.	-	15
Herbaceous vegetation	-	30	Epilobium spp.	-	15
Lichens	-	1	Potentilla palustris	-	
Mosses	-	15	Menyanthes trifoliata	-	
Live wood	-	1	Rubus chamaemorus	-	
Litter	-	20	Cornus canadensis	-	
Bare ground	-	4	Linnaea borealis	-	
Charred ground	-	1			
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-	1	Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	10	Ledum palustre	-	
Twigs & branches >5cm	-	15	Andromeda polifolia	-	
Vertical stumps	-		Oxycoccus microcarpus	-	
Marchantia polymorpha	-	35	Myrica gale	-	
Mushrooms	-	1	Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	1(1)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	1(2)
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-		
Picea glauca (WS)	-	1(7)	
Betula papyrifera (B)	-	20(152)	
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 19-23 *

		Quadrat			
		1	2	3	4
Litter Depth (cm)	-	11	14	12	10
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-				
Nearest sapling (m, mm)	-				

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-		Sedge spp.	-	70
Tall shrubs	-		Grass spp.	-	10
Low shrubs	-		Equisetum spp.	-	
Herbaceous vegetation	-	90	Epilobium spp.	-	
Lichens	-		Potentilla palustris	-	
Mosses	-		Menyanthes trifoliata	-	
Live wood	-		Rubus chamaemorus	-	
Litter	-	85	Cornus canadensis	-	
Bare ground	-		Linnaea borealis	-	
Charred ground	-				
Standing water	-	99	% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-		Ledum palustre	-	
Twigs & branches >5cm	-		Andromeda polifolia	-	
Vertical stumps	-		Oxycoccus microcarpus	-	
Marchantia polymorpha	-		Myrica gale	-	
Mushrooms	-		Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:

Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 19-25

		Quadrat 1	2	3	4
Litter Depth (cm)	-	1	3	2	3
Height of Log Debris (cm)	-		31	25	20
Largest Diameter of Log Debris (cm)	-		10	10	11
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-		6.4,7	18.0,9	14.5,14
Nearest sapling (m, mm)	-	2.5,1	4.2,3	0.6,10	5.1,4

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-	2	Sedge spp.	-	
Tall shrubs	-	5	Grass spp.	-	15
Low shrubs	-		Equisetum spp.	-	
Herbaceous vegetation	-	35	Epilobium spp.	-	10
Lichens	-	1	Potentilla palustris	-	
Mosses	-	60	Menyanthes trifoliata	-	
Live wood	-	1	Rubus chamaemorus	-	
Litter	-	40	Cornus canadensis	-	
Bare ground	-	4	Linnaea borealis	-	
Charred ground	-	1			
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-	35	Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	15	Ledum palustre	-	
Twigs & branches >5cm	-	1	Andromeda polifolia	-	
Vertical stumps	-	1	Oxycoccus microcarpus	-	
Marchantia polymorpha	-		Myrica gale	-	
Mushrooms	-		Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	1(4)
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-		
Picea glauca (WS)	-	3(39)	
Betula papyrifera (B)	-	8(12)	20
Larix laricina (L)	-		
Populus tremuloides (P)	-	1(1)	

VEGETATION PLOT NUMBER - 19-29

	Quadrat 1	2	3	4
Litter Depth (cm)	- 4		12	16
Height of Log Debris (cm)	-			
Largest Diameter of Log Debris (cm)	-			
Distance to and Diameter of:				
Nearest live tree (m, cm)	- 1.7,12		28.1,8	
Nearest dead tree (m, cm)	-			
Nearest sapling (m, mm)	-15.6,10	13.5,3	18.9,8	9.0,30

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-		Sedge spp.	-
Tall shrubs	-	1	Grass spp.	-
Low shrubs	-	70	Equisetum spp.	- 10
Herbaceous vegetation	-	70	Epilobium spp.	-
Lichens	-		Potentilla palustris	-
Mosses	-	20	Menyanthes trifoliata	- 40
Live wood	-		Rubus chamaemorus	-
Litter	-	50	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-	50	% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	- 70
Twigs & branches <5cm	-	1	Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	1(1)
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 19-32

		Quadrat 1	2	3	4
Litter Depth (cm)	-			7	
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-	1.2,7	1.1,12	3.3,8	5.1,11
Nearest dead tree (m, cm)	-	9.6,7	5.7,10	16.5,12	9.6,10
Nearest sapling (m, mm)	-	4.3,50	5.6,43	2.9,22	6.4,26

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-	45	Sedge spp.	-	
Tall shrubs	-		Grass spp.	-	
Low shrubs	-	40	Equisetum spp.	-	
Herbaceous vegetation	-	5	Epilobium spp.	-	
Lichens	-	10	Potentilla palustris	-	
Mosses	-	90	Menyanthes trifoliata	-	
Live wood	-	1	Rubus chamaemorus	-	
Litter	-	10	Cornus canadensis	-	
Bare ground	-		Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-	1	Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	30	Ledum palustre	-	10
Twigs & branches >5cm	-		Andromeda polifolia	-	
Vertical stumps	-		Oxycoccus microcarpus	-	20
Marchantia polymorpha	-		Myrica gale	-	
Mushrooms	-	1	Vaccinium uliginosum	-	10
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	
Betula nana	-	10(3)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-	5(1)	
Picea glauca (WS)	-		
Betula papyrifera (B)	-		
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 19-38 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	5	4	3	1
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-	3.1,14	4.8,24	0.7,14	14.3,29
Nearest dead tree (m, cm)	-				
Nearest sapling (m, mm)	-	9.1,5	10.2,32	5.8,18	4.5,40

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-	95	Sedge spp.	-	
Tall shrubs	-	65	Grass spp.	-	
Low shrubs	-		Equisetum spp.	-	15
Herbaceous vegetation	-	50	Epilobium spp.	-	
Lichens	-	1	Potentilla palustris	-	
Mosses	-	80	Menyanthes trifoliata	-	
Live wood	-		Rubus chamaemorus	-	
Litter	-	60	Cornus canadensis	-	
Bare ground	-		Linnaea borealis	-	30
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-	1	Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	8	Ledum palustre	-	
Twigs & branches >5cm	-		Andromeda polifolia	-	
Vertical stumps	-		Oxycoccus microcarpus	-	
Marchantia polymorpha	-		Myrica gale	-	
Mushrooms	-	1	Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	1(9)
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 19-40 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	2	6		1
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-	6.8,24	2.1,19	1.2,19	4.1,21
Nearest dead tree (m, cm)	-	0.8,23	5.5,29	0.7,8	4.1,21
Nearest sapling (m, mm)	-	1.2,4	26.0,55	14.5,9	15.7,20

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-	8	Sedge spp.	-
Tall shrubs	-	25	Grass spp.	-
Low shrubs	-	6	Equisetum spp.	- 10
Herbaceous vegetation	-	12	Epilobium spp.	-
Lichens	-	2	Potentilla palustris	-
Mosses	-	15	Menyanthes trifoliata	-
Live wood	-		Rubus chamaemorus	-
Litter	-	80	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-		% Cover of Low Shrubs:	
Dead moss/lichen	-	3	Chamaedaphne calyculata	-
Twigs & branches <5cm	-	90	Ledum palustre	-
Twigs & branches >5cm	-		Andromeda polifolia	-
Vertical stumps	-	20	Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-		Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	
Betula nana	-	
Rosa acicularis	-	3(6)
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 19-43 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	7	8	6	14
Height of Log Debris (cm)	-	52			
Largest Diameter of Log Debris (cm)	-	6			
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-				
Nearest sapling (m, mm)	-	3.3,2	1.3,2	1.0,2	4.2,6

% Cover of:			% Cover of Herbaceous Vegetation:	
Live trees	-	45	Sedge spp.	-
Tall shrubs	-	15	Grass spp.	- 10
Low shrubs	-		Equisetum spp.	- 40
Herbaceous vegetation	-	65	Epilobium spp.	- 10
Lichens	-		Potentilla palustris	-
Mosses	-	85	Menyanthes trifoliata	-
Live wood	-	1	Rubus chamaemorus	-
Litter	-	85	Cornus canadensis	-
Bare ground	-		Linnaea borealis	-
Charred ground	-			
Standing water	-		% Cover of Low Shrubs:	
Dead moss/lichen	-		Chamaedaphne calyculata	-
Twigs & branches <5cm	-	7	Ledum palustre	-
Twigs & branches >5cm	-	2	Andromeda polifolia	-
Vertical stumps	-		Oxycoccus microcarpus	-
Marchantia polymorpha	-		Myrica gale	-
Mushrooms	-	2	Vaccinium uliginosum	-
Moving water	-			

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	1(1)
Alnus spp.	-	20(19)
Betula nana	-	
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-	1(5)	
Picea glauca (WS)	-		
Betula papyrifera (B)	-	50(139)	15
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 19-50 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	18	18	13	10
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-		6.3,9	8.7,7	
Nearest dead tree (m, cm)	-	8.6,10	8.1,14	30.0,8	3.7,7
Nearest sapling (m, mm)	-	2.4,2	8.1,4	7.2,11	6.5,2

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-	1	Sedge spp.	-	
Tall shrubs	-	10	Grass spp.	-	
Low shrubs	-	40	Equisetum spp.	-	
Herbaceous vegetation	-	10	Epilobium spp.	-	
Lichens	-	1	Potentilla palustris	-	
Mosses	-	85	Menyanthes trifoliata	-	
Live wood	-	1	Rubus chamaemorus	-	
Litter	-	50	Cornus canadensis	-	
Bare ground	-		Linnaea borealis	-	
Charred ground	-				
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	35	Ledum palustre	-	25
Twigs & branches >5cm	-		Andromeda polifolia	-	
Vertical stumps	-		Oxycoccus microcarpus	-	
Marchantia polymorpha	-		Myrica gale	-	
Mushrooms	-		Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:		
Salix spp.	-	
Alnus spp.	-	
Betula nana	-	15(10)
Rosa acicularis	-	
Viburnum edule	-	

% Cover and (Number of Stems) of Seedlings:			% Cover of Saplings:
Picea mariana (BS)	-	1(2)	
Picea glauca (WS)	-		
Betula papyrifera (B)	-	3(27)	
Larix laricina (L)	-		
Populus tremuloides (P)	-		

VEGETATION PLOT NUMBER - 19-51 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-	13	15	12	9
Height of Log Debris (cm)	-				
Largest Diameter of Log Debris (cm)	-				
Distance to and Diameter of:					
Nearest live tree (m, cm)	-	22.0,7	14.5,8		
Nearest dead tree (m, cm)	-		14.5,8		
Nearest sapling (m, mm)	-	23.6,60	16.2,20	9.0,2	7.3,3

% Cover of:		
Live trees	-	
Tall shrubs	-	
Low shrubs	-	
Herbaceous vegetation	-	90
Lichens	-	
Mosses	-	
Live wood	-	
Litter	-	95
Bare ground	-	
Charred ground	-	
Standing water	-	80
Dead moss/lichen	-	
Twigs & branches <5cm	-	
Twigs & branches >5cm	-	
Vertical stumps	-	
Marchantia polymorpha	-	
Mushrooms	-	
Moving water	-	

% Cover of Herbaceous Vegetation:	
Sedge spp.	- 85
Grass spp.	-
Equisetum spp.	-
Epilobium spp.	-
Potentilla palustris	-
Menyanthes trifoliata	-
Rubus chamaemorus	-
Cornus canadensis	-
Linnaea borealis	-

% Cover of Low Shrubs:	
Chamaedaphne calyculata	-
Ledum palustre	-
Andromeda polifolia	-
Oxycoccus microcarpus	-
Myrica gale	-
Vaccinium uliginosum	-

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 20-25 *

		Quadrat 1	2	3	4
Litter Depth (cm)	-			15	11
Height of Log Debris (cm)	-	97	96	61	84
Largest Diameter of Log Debris (cm)	-	19	20	21	11
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-	23.3,21	23.6,17		
Nearest sapling (m, mm)	-				21.2,30

% Cover of:			% Cover of Herbaceous Vegetation:		
Live trees	-		Sedge spp.	-	
Tall shrubs	-		Grass spp.	-	
Low shrubs	-		Equisetum spp.	-	
Herbaceous vegetation	-	30	Epilobium spp.	-	15
Lichens	-	2	Potentilla palustris	-	
Mosses	-	3	Menyanthes trifoliata	-	
Live wood	-		Rubus chamaemorus	-	
Litter	-	15	Cornus canadensis	-	
Bare ground	-		Linnaea borealis	-	
Charred ground	-	5			
Standing water	-		% Cover of Low Shrubs:		
Dead moss/lichen	-		Chamaedaphne calyculata	-	
Twigs & branches <5cm	-	40	Ledum palustre	-	
Twigs & branches >5cm	-	25	Andromeda polifolia	-	
Vertical stumps	-	1	Oxycoccus microcarpus	-	
Marchantia polymorpha	-	90	Myrica gale	-	
Mushrooms	-	1	Vaccinium uliginosum	-	
Moving water	-				

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:		% Cover of Saplings:
Picea mariana (BS)	-	
Picea glauca (WS)	-	
Betula papyrifera (B)	-	
Larix laricina (L)	-	
Populus tremuloides (P)	-	

VEGETATION PLOT NUMBER - 20-23 *

		Quadrat			
		1	2	3	4
Litter Depth (cm)	-	4	2	7	11
Height of Log Debris (cm)	-		31	35	19
Largest Diameter of Log Debris (cm)	-		17	15	9
Distance to and Diameter of:					
Nearest live tree (m, cm)	-				
Nearest dead tree (m, cm)	-			21.7,7	24.9,9
Nearest sapling (m, mm)	-			1.7,5	

% Cover of:		
Live trees	-	
Tall shrubs	-	
Low shrubs	-	
Herbaceous vegetation	-	70
Lichens	-	
Mosses	-	20
Live wood	-	
Litter	-	85
Bare ground	-	4
Charred ground	-	
Standing water	-	
Dead moss/lichen	-	1
Twigs & branches <5cm	-	2
Twigs & branches >5cm	-	
Vertical stumps	-	
Marchantia polymorpha	-	15
Mushrooms	-	
Moving water	-	

% Cover of Herbaceous Vegetation:		
Sedge spp.	-	
Grass spp.	-	
Equisetum spp.	-	30
Epilobium spp.	-	30
Potentilla palustris	-	
Menyanthes trifoliata	-	
Rubus chamaemorus	-	
Cornus canadensis	-	
Linnaea borealis	-	

% Cover of Low Shrubs:	
Chamaedaphne calyculata	-
Ledum palustre	-
Andromeda polifolia	-
Oxycoccus microcarpus	-
Myrica gale	-
Vaccinium uliginosum	-

% Cover and (Number of Stems) of Tall Shrubs:	
Salix spp.	-
Alnus spp.	-
Betula nana	-
Rosa acicularis	-
Viburnum edule	-

% Cover and (Number of Stems) of Seedlings:	
Picea mariana (BS)	-
Picea glauca (WS)	-
Betula papyrifera (B)	-
Larix laricina (L)	-
Populus tremuloides (P)	-

% Cover of Saplings:

Appendix B. Number of small mammals trapped in and adjacent to the Bear Creek burn, Alaska, August 1984-86.

	1984		1985				1986			
	Burned white spruce	Unburned white spruce	Burned white spruce	Unburned white spruce	Burned black spruce	Unburned black spruce	Burned white spruce	Unburned white spruce	Burned vegetation mosaic	Unburned vegetation mosaic
Number of trap nights	450	450	600	600	600	600	360	360	1200	1200
Clethrionomys rutilus	19	60	8	13	1	16	13	21	3	12
Microtus xanthognathus	1	9	22	0	5	1	15	7	0	10
Microtus pennsylvanicus	-[a]	0	0	1	2	0	0	0	5	0
Microtus oeconomus	-[a]	0	0	1	1	0	0	0	7	0
Synaptomys borealis	-[a]	0	0	0	8	2	2	0	2	2
Lemmus sibiricus	-[a]	0	0	0	0	0	0	0	0	1
Zapus hudsonicus	0	0	0	0	0	0	2	0	1	0
Sorex spp.	10	10	3[b]	9[b]	3[b]	5[b]	58[c]	28[d]	155[e]	120[f]

[a] Five microtines (none of which were *Clethrionomys rutilus* or *Microtus xanthognathus*) were inadvertently discarded before they could be identified.
[b] Not identified to species.
[c] Twenty-eight of the 58 shrews were identified, 27 *Sorex cinereus* and 1 *Sorex hoyi*; many shrews caught in pitfall traps were consumed by other shrews, except for the tails.
[d] Fourteen of the 28 shrews were identified, all *Sorex cinereus*.
[e] Ninety-six of the 155 shrews were identified, 90 *Sorex cinereus* and 6 *Sorex hoyi*.
[f] One hundred-six of the 120 shrews were identified, 105 *Sorex cinereus* and 1 *Sorex hoyi*.