THE HUDSON RIVER MAMMAL CONTAMINANT ASSESSMENT PROJECT

DATA REPORT FOR VISITATION OF MINK AND OTHER SPECIES TO SCENT STATIONS WITHIN THE HUDSON AND MOHAWK DRAINAGES, 2000/20001

David T. Mayack
New York State Department of Environmental Conservation

Hale Creek Field Station
182 Steele Avenue Extension
Gloversville, New York 12078
Phone: (518) 773-7318
Fax: (518) 773-7319
Email: dtmayack@gw.dec.state.ny.us

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ABSTRACT

We conducted a study to evaluate whether visitation by mink and other species to scent stations can serve as an index to their relative abundance. Scent stations were generally located at stream-road intersections on tributary streams in the upper Hudson and the Mohawk River drainages. Scent stations were located at two nominal distances from the main-stem of each river: less than 6 km (near stations) and equal to or greater than 6 km (far stations). Typically, scent stations were monitored weekly from October 3, 2000 until April 5, 2001. Track imprints on track plates provided evidence of visitation by mink and other species. Visitation record was lost for large proportion of stations during nominal weeks12, 13 and 14 (12/19/00, 12/26/00 and 1/3/01) due to flooding. Consequently, visitation record was summarized for two discrete seasonal periods: nominal weeks 1 to 11 (10/03/00 to 12/12/00), representing the fall and early winter (fall period) and nominal weeks 15 to 26 (1/9/01 to 3/27/01), representing the late winter and spring (spring period). Minor loss of record was noted within each monitoring period. Consequently, variation in the percentage of record among locational categories (near Hudson, near Mohawk, far Hudson, far Mohawk) was summarized for each monitoring period. Tracks from seventeen species or taxonomic groups were recorded on track plates. Mammal tracks were identified and measured and, for weasels (ermine [*Mustela erminea*], long-tailed weasel [*Mustela frenata*], mink and fisher [*Martes pennanti*]) and squirrels (Eastern chipmunk [*Tamias striatus*], red squirrel [*Tamiasciurus hudsonicus*] and Eastern gray squirrel [*Sciurus carolinesis*]), discriminant analysis based on track measurement was conducted to assess reliability of species identification. Identifications of squirrel and weasel species other than long-tailed weasel were supported by discriminant analysis. Variation in visitation by species or taxonomic groups among locational categories was summarized for each monitoring period. Approximately half the stations in each category (41 to 57%) were never visited by mink during either monitoring period with the exception of the near-Hudson category which had a considerably higher percentage of stations never visited by mink (77%) during the fall period. Visitation by a number of other species in addition to mink was also variable among locational categories and monitoring periods. Variation in visitation by mink or other species was not related to variation in record loss among locational categories within each monitoring period.

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INTRODUCTION

The loading of polychlorinated biphenyls (PCBs) in the Hudson River was the highest of any major river system in the United States (Horn et al. 1979). An electrical capacitor manufacturing plant located at Hudson Falls, New York, and its sister plant, located approximately 2 km downstream at Fort Edward, New York, discharged PCBs into the Hudson River starting in 1947. Between 1966 and 1974, these plants purchased 35,000 metric tons of PCBs, representing approximately 15% of domestic sales (Horn et al. 1979). From the 1940's to 1977, up to 1.33 million pounds of PCBs were discharged into the upper Hudson River. Historic discharges, continuing releases from fractured bedrock and erosion of contaminated soils and sediments have contaminated river water, sediments, floodplains, fish, wildlife and other biota with PCBs.

Analysis of a small number of mink (*Mustela vison*) and river otter (*Lontra canadensis,* formerly *Lutra canadensis* [Wilson and Reeder, 1993]) collected from the Hudson River region of New York State between 1982 and 1984 suggests that high levels of PCB contamination were present in populations of these mustelids in the Hudson River drainage (Foley et al. 1988). The maximum level in mink was greater than levels known to cause reproductive failure in ranched mink (Foley et al. 1988). This degree of contamination suggests that reproductive impairment and a consequent decrease in abundance may be present in wild populations of mink and river otter occupying riparian habitats of the Hudson River drainage. Although PCB levels in mustelids collected from the Hudson River region between 1982 and 1984 were the highest of any collected from eight regions (ecozones) of New York State, the number of animals collected in this region was too small to quantify the extent of contamination in these populations. The goal of the contaminant assessment project is to provide additional information on the extent of contamination and its effect on mink, river otter and muskrats (*Ondatra zibethicus*) within the Hudson River ecosystem. One objective towards this goal is to determine if variation in mink abundance within the upper Hudson River drainage is related to contaminant discharge to the main-stem river.

We conducted a study to evaluate whether visitation by mink and other species to scent stations can serve as an index to their relative abundance. Scent stations were generally located at stream-road

intersections on tributary streams in the upper Hudson River and the Mohawk River drainages. The Mohawk River drainage was included as a potential reference area. Scent stations were located at two nominal distances from the main stem of each river: less than 6 km (near stations) and equal to or greater than 6 km (far stations). Mink visiting stations less than 6 km from the main-stem river were considered to have home ranges adjacent to the main-stem river. In contrast, mink visiting stations equal to or greater than 6 km from the main-stem river were considered to have home ranges disjunct from the main-stem river. Typically, scent stations were monitored weekly from October 3, 2000 until April 5, 2001. Track imprints on track plates provided evidence of visitation by mink and other species. Mammal tracks were identified and measured. We compiled a database for visitation frequencies of animals to scent stations and related monitoring data and a database for measurements of mammal tracks.

Monitoring data, track measurement data and visitation frequencies for species were summarized. Because of major loss of record from December 17, 2000 to December 31, 2000 due to severe flooding, monitoring data was summarized for two discrete monitoring periods: 10/03/00 to 12/12/00, representing the fall and early winter and1/9/01 to 3/27/01, representing the late winter and spring. To evaluate the effect of lost record on monitoring, the percentage of record was calculated for each locational category (near Hudson, near Mohawk, far Hudson, far Mohawk) within each monitoring period. Summary statistics were calculated for track measurements of medium-sized mammals. For weasels (ermine [*Mustela erminea*], long-tailed weasel [*Mustela frenata*], mink and fisher [*Martes pennanti*]) and squirrels (Eastern chipmunk [*Tamias striatus*], red squirrel [*Tamiasciurus hudsonicus*] and Eastern gray squirrel [*Sciurus carolinesis*]), discriminant analysis based on track measurement was used to assess the reliability of species identification. Also, the effect of including tracks that have statistically estimated values for one or more missing measurements on the reliability of species-level identification for weasels and squirrels was evaluated by discriminant analysis. Visitation by species or taxonomic groups was summarized as a frequency distribution for stations categorized by the specific number of repeat visits to stations. Distributions were calculated for each locational category within each monitoring period. A categorical analysis of visitation frequencies (categorized as number of stations never visited versus the number of stations visited one or more times) using Chi-square (χ^2) was conducted for each species or taxonomic group. Chi-square tests were performed to determine the independence of visitation categories relative to drainage (Hudson, Mohawk) for both near-station and far-station categories. Visitation rates (number of visits by a species per number of stations monitored during each weekly date) were also summarized as cumulative visitation rates for each locational category within each monitoring period.

MATERIALS AND METHODS

We monitored 82 scent stations: 32 and 50 within the upper Hudson River and Mohawk River drainages, respectively (Appendix I). Typically, track plates and scent attractant were placed in open-ended enclosures between September 26, 2000 and October 11, 2000 and checked and replaced weekly, from October 3, 2000 until April 5, 2001. Severe flooding during December 17, 2000 to December 31, 2000 resulted in the loss of many enclosures or track plates. Enclosures and/or track plates were replaced as soon as possible and monitoring continued.

Evidence of visitation to scent stations by mink and as well as other small to medium-sized vertebrates (primarily mammals) was recorded as imprints of tracks on track plates placed in protective enclosures. A board with both ends sooted with an acetylene torch and a piece of self-adhesive shelving paper placed in the center comprised a track plate (Loukmas et al. 2003). Tracks were imprinted on either the shelving paper or the sooted areas of the track plate. All papers with tracks and boards with tracks of ermine, long-tailed weasel, mink, and fisher appearing only in the sooted area were collected and archived.

Scent Stations

The selection of station locations was based on riparian habitat and food requirements for mink described by Eagle and Whitman (1987), Linscombe et al. (1982) and Burgess (1978). Stations were normally within 200 m of a stream-road intersection and 3 m from the water-land interface. Track-plate enclosures were carefully camouflaged with surrounding materials such as branches, stones, grass, and leaf litter to mimic a tunnel. Two track-plate enclosures, each containing scent attractant, were placed on opposite sides of the stream at each scent station with the exception of five stations with only one enclosure. For the Hudson and Mohawk rivers, 15 and 23 stations, respectively, were located within 6 km of the main stem, and 17 and 27 stations, respectively, were located at distances equal to or greater than 6 km from the main stem. Road conditions and safety concerns, especially during snowfall, were also taken into consideration in station selection. Some stations were relocated because of safety concerns and limited access. Station locations and enclosures were uniquely identified by number. A numerically stamped aluminum tag (1-152; Forestry Suppliers Inc.) was attached to each enclosure.

Track-Plate Enclosures and Plates

Track-plate enclosures were based upon a box design by Zielinski and Kucera (1995). Enclosures were constructed of 0.95-cm sheets of CDX plywood and pine furring strips (5 x 5 cm). Each

enclosure (23 x 23 x 81 cm, inside dimensions) was constructed from four furring strips (5 x 5 x 81 cm) and four sheets of plywood (two 23 X 81-cm sheets and two 30 x81-cm sheets) assembled with 3-cm drywall screws (Fig. 1). An open microcentrifuge tube (1.5 ml) containing Winkler's Brown Beauty mink gland lure (Sterling Fur Company) was placed in a hardware cloth pocket (6 x 6 cm) attached to the mid inside wall, near the roof of the enclosure. Track plates were constructed of 0.32-cm sheets (23 X 81 cm) of oil-tempered or pressed hardboard. A board with a 25-cm segment on each end sooted with an acetylene torch and a 31-cm wide piece of almond-colored, self-adhesive shelving (contact) paper taped (duct tape) adhesive side up in the center comprised a track plate (Fig 2., Loukmas et al. 2003). After soot and paper had been applied, track plates were transported on edge inside a carrying box (25 x 48 x 86 cm) designed to hold 21 plates.

Monitoring

During each visit after initial placement of the enclosure, the track plate was checked for track imprints on either the contact paper or the sooted plate and the tube containing lure was replaced. If track plates and/or enclosures were found missing due to flooding, vandalism etc., they were replaced during the visit if replacements were available. During the period of extensive flooding (December 17, 2000 to December 31, 2000), enclosures were not replaced for one to two weeks (nominal weeks 13 and 14).

Contact papers with tracks and track plates with weasel tracks were labeled with the enclosure number, date, and stream-road intersection. Preliminary track identifications were entered on the field data sheets. Observations of mink and other animals, mink sign including tracks in snow or mud near the track-plate enclosures and watercourse conditions were also recorded on the field data sheets. Papers with tracks and boards with tracks of ermine, long-tailed weasel, mink, and fisher appearing only in the sooted area were collected. Contact papers were removed from the plates and inserted into quick-load sheet protectors (Avery Inc.) for archiving. Sooted boards with mink, long-tailed weasel, ermine and fisher tracks (as well as one board with gray squirrel tracks) were stored vertically, separated by dividers in a box. Selected tracks from mammals on archived papers and boards were subsequently measured.

Track Identification and Measurement

Staff experienced in the identification of mammal tracks used Rezendes (1999) and Taylor and Raphael (1988) as reference guides for identification of tracks for species or taxonomic groups possibly visiting scent stations (Table 1). Archived papers and sooted boards were reviewed in the laboratory for additional tracks not observed at the time of collection and to verify initial identifications. Long-tailed weasel tracks (first ID code 2) were additionally identified as either mink (second ID code

code 2a) or ermine (second ID code 2b) tracks because they overlap in size and are similar in shape to those from mink and ermine.

We measured tracks of mink, long-tailed weasels, ermine, fishers, red squirrels, Eastern gray squirrels, Eastern chipmunks, raccoons (*Procyon lotor*), striped skunks (*Mephitis mephitis*), Virginia opossums (*Didelphis virginiana*), feral cats (*Felis catus*), and cottontail rabbits (*Sylvilagus spp*.). Tracks recorded on shelving papers or sooted track-plates were measured using dial calipers (Spi 2000, model 31-415-3 and Tajima Dial-15) to 0.05 mm. Tracks on shelving paper were measured through the transparent sheet protector. The most complete and clearest tracks within a track set were selected for measurement. For each species appearing on each shelving paper or sooted board, one front and one hind foot track were selected from track sets for measurement when possible. Because front and hind tracks of feral cats were indistinguishable, measurements were taken for only one track of each cat visit. For tracks that appeared on the same paper, tracks selected for measurement were labeled with a track identification number. Boards with tracks on the sooted area were labeled with date and location. Tracks of mice, voles, shrews, frogs, salamanders, and birds were not measured.

Taylor and Raphael (1988) developed a standard set of measurements for tracks of medium- to large-sized mammals recorded as negative imprints on aluminum track plates (Fig. 3). We modified the standard track measurements for mammals developed by Taylor and Raphael to take advantage of the clarity of positive imprints on shelving paper. Standard measurement "B" is "the horizontal line measuring the widest spread of the toes" (Taylor and Raphael 1988). However, for weasel species, the thumb is sometimes not visible; therefore, measurement "B" was modified in our study to measure the lateral spread of the four foremost toes. The standard measurement "G" is "the distance from the foremost claw to the back of palm pad" (Taylor and Raphael 1988). Because claw marks were rarely visible, "G" was changed to measure the mid-section width of the palm pad. We added measure "H", the distance from the front edge of the palm pad to the back edge of the foremost toe, to our set of track measurements. This measure helped to distinguish front from hind foot in weasel species. When all five toes were visible on a track, the horizontal line measuring the widest spread of the toes, was included in our set of measurements as measure "I."

Diversity in track characteristics of individual species resulted in some measures present for certain species but not for others. Therefore, not all measures ("A" through "I") were measured on every track. The following describes the standard measurements recorded when ever possible for the individual species and taxonomic groups:

a) Mink, long-tailed weasel, ermine, and fisher: Standard measurements taken for these weasel tracks were A through I for both front and hind foot (Fig. 4). One front and one hind foot were measured when possible.

b) Squirrels: Standard measurements taken for squirrel tracks (red squirrel, Eastern gray squirrel and Eastern chipmunk) were A, C through E, and G through I for front foot and A, C through F, H and I for hind foot (Fig. 5). One front and one hind foot were measured when possible.

c) Raccoon: Standard measurements taken for raccoon tracks were A, C through E, H and I for front foot and E, H and I for hind foot (Fig. 6). One front and one hind foot were measured when possible.

d) Striped Skunk: Standard measurements taken for striped skunk tracks were A, C through E, H and I for front foot and E, H and I for hind foot (Fig. 7). One front and one hind foot were measured when possible.

e) Virginia Opossum: Standard measurements taken for Virginia opossum tracks were A, C through E, H and I for both front and hind foot (Fig. 8). One front and one hind foot were measured when possible.

f) Feral Cat: Standard measurements taken for feral cat tracks were A, C, D, H and I for both front and hind foot (Fig. 9). Only one track was measured for feral cats.

g) Cottontail Rabbits: Standard measurements taken for cottontail rabbit tracks were F and I for both front and hind foot (Fig. 10). One front and one hind foot were measured when possible.

RESULTS

Monitoring

The initial set-up of scent stations could not be accomplished on schedule at all sites and track plates could not be examined or recovered during all scheduled monitoring visits due to flooding, snow cover, lack of access, vandalism etc. This resulted in no record for a number of stations and dates scheduled for monitoring (Figure 11). Loss of record during the initial weeks of the study was associated

with a delay in the initial set-up of scent stations. Approximately half the stations in the near-Hudson and far-Mohawk categories were not deployed until a week later than scheduled (nominal week one). Likewise, the deployment of stations was delayed in the far-Hudson category. Approximately half the stations wee set out two weeks later than scheduled (nominal week two) and the remainder were set out three weeks later than scheduled (nominal week three). Limited record was obtained on December 19, and 26, 2000 and January 3, 2001 (nominal weeks 12, 13, and 14) from the Mohawk and Hudson drainages due to severe flooding. Loss of record was greater in the Hudson drainage, both in the number and percentage of stations affected. Similarly, loss of record was evident due to weather conditions in the Hudson but not in the Mohawk drainage on February 6, 2001 (nominal week 19).

A number of stations were relocated or added during the study period which resulted in no record for monitoring dates when these stations were not in place. Four stations were relocated approximately mid way through the study: two far-Mohawk stations (2 relocated at 80 and 56 relocated at 77) and two near-Mohawk stations (14.0 relocated at 79 and 9 relocated 78). A number of stations were added to the far-Hudson (71 and 74), near-Hudson (69, 70, 75, and 76) and far-Mohawk (72 and 73) categories from October 30, 2000 to January 1, 2001 (nominal weeks 5 to 15).

A number of stations were not included in the data summary. Stations 14.1, 14.0 26.1, 26.0 and 79 within the near-Mohawk category were not included because only a single enclosure, instead of two, was used at each station and the station location was on the main stem of the Mohawk River in contrast a stream-road intersection on a tributary as typically used in the study. No mink or mink possibly identified as long-tailed weasels visited these stations possibly due to their location and the reduced attractiveness of a single enclosure.

In order to minimize biases in the comparison of visitation frequencies due to loss of record, records for all stations for a number of monitoring dates were not included in the data summary. Records for all location categories for nominal weeks 12 to 14 and week 27 were removed from the comparison of visitation frequencies due to the major loss of record from the Hudson River drainage (Figure 11). This resulted in visitation record for two discrete seasonal periods: nominal weeks 1 to 11 (10/03/00 to 12/12/00), representing the fall and early winter (fall monitoring period) and nominal weeks 15 to 26 (1/9/01 to 3/27/01), representing the late winter and spring (spring monitoring period). Also, records for stations 72 and 73 and records for stations 56 and 48 were removed from the summary within the fall and spring periods, respectively, due to extremely limited record (less than 42% of the monitoring dates).

Although the remaining monitoring dates that comprised each monitoring period had stations with a high proportion of record, some loss of record was still evident within each period.

To evaluate the effect of lost record on monitoirng, the percentage of record was calculated for each locational category (near Hudson, near Mohawk, far Hudson, far Mohawk) within each monitoring period. Percentages were calculated based on the number weekly monitoring visits to stations that resulted in a record (presence of tracks or track plates capable of recording tracks) relative to the maximum number of records potentially available (stations within each category times weeks; fall period, 11 weeks; and spring period, 12 weeks; Table 2). Calculations of percent record were made for two conditions under which record was obtained: 1) weekly monitoring that yielded record for one or more track-plate enclosures at a station and 2) weekly monitoring that yielded record for both track-plate enclosures at a station (Table 2).

Record was obtained for a high percentage of scheduled monitoring visits within each locational category during both monitoring periods (Table 2). The percentage of scheduled monitoring with at least one or more enclosures providing record at a station was equal to or greater than 90% for all locational categories with the exception of the far-Hudson during the fall (85%). (The greater delay in the initial set-up of far-Hudson stations reduced the number of weekly monitoring visits resulting in a lower percentage of record as compared to other locational categories during the fall period.) The percentage of scheduled monitoring with both enclosures at a station yielding record was somewhat lower (79% to 99% for locational categories, both monitoring periods) than the comparable percentage for scheduled monitoring visits that included stations with one or more enclosures with record (85% to 100% for locational categories, both monitoring periods).

The percentage of record obtained for both the near and far categories in the Mohawk was greater than the percentages obtained for comparable categories in the Hudson River drainage during both monitoring periods (Table 2). However, for percentages based on at least one or more enclosures with record, the differences in the percentage of record near the main stem of each river (near stations, 10% and 7%, fall and spring, respectively) were similar to differences in the percentage of record for remote stations in each drainage (far stations, 9% and 2%, fall and spring, respectively). Similar differences in percentage of record for distance categories between drainages were also evident for percentages based on both enclosures with record. Differences in the percentage of record for near stations, 16% and 6%, fall and spring, respectively, were similar to far stations, 15% and 9%, fall and spring, respectively. Apparently, the degree of record obtained within monitoring periods, although somewhat greater for

locational categories within the Mohawk River drainage as compared the Hudson River drainage, exhibits a consistent difference between drainages for each distance category (near, far) within each monitoring period.

The relative number of stations having potential reduction in visitation at some time during the week due to flooding or snow cover was summarized. Enclosures that were initially able to record tracks (and thus providing record) but were found without access to the track-plate due to snow cover or exhibited evidence that flooding may have reduced visitation at some time during the week were noted. The number and percentage of weekly monitoring visits for which compromised access to the track plate was evident for one or more track-plate enclosures was calculated for each locational category within each seasonal period (Table 2). The percentage of record limited by snow cover or flooding was calculated as a percentage of the total number of weekly monitoring visits that yielded record for one or more enclosures. The percentage of record compromised by snow or flooding was less than 10% (2% to 9%) for locational categories during the fall. The percentage of record compromised by snow or flooding remained under 10% (5% and 9%, near and far categories, respectively) for the Mohawk River drainage but increased to nearly 20% (18% and 19% near and far categories, respectively) for the Hudson River drainage during the spring period.

Track Measurements

Tracks from seventeen of the nineteen species or taxonomic groups expected to visit scent stations were recorded on track plates; only red fox (*Vulpes vulpes*) and muskrat (*Ondartra zibethicus*) did not visit stations (Table 3). Forty-five of the 246visits from weasel species made imprints only on the sooted portion of the track plate (Table 4). A total of 2047 tracks from medium-sized mammals were imprinted on shelving paper and measured; 258 of these tracks were from weasel species (mink, fisher, ermine or long-tailed weasels; Table 5). An additional 36 tracks from weasel species were measured from imprints on the sooted portion of the track plate (Table 6). Mink comprised the largest percentage of weasel tracks measured (44 and 75% on shelving paper and soot, respectively; Tables 5 and 6). A total of 1237 tracks from squirrel species (Eastern chipmunk, red and Eastern gray squirrels) were measured on shelving paper (Table 5). The number of tracks measured for each of the remaining medium-sized mammal species ranged from 36 to 161(Table 5).

For most species, tracks were positively identified as either from front or hind foot (Tables 5 and 6). Only 5% of rabbit tracks could not be identified as to foot origin. In contrast, front-foot tracks were

not distinguishable from hind-foot tracks for feral cats. Also, 25% of mink tracks could not be identified positively as to foot origin; for other weasel species, approximately half the tracks could not be positively identified as to foot origin (Table 7).

Of the nine parameters proposed for measurement (Fig. 1), a number of parameters either were not present or measurable on relatively few tracks (Tables 5 and 6). Parameters "D", "E", "F", and "I" were measurable on only a relatively low number of tracks of weasel species occurring on paper or soot. Parameters "B", "F" and "G" were not present on any track from raccoon, striped skunk or Virginia opossum. In addition, parameters "A", "C" and "D" were not present on hind-foot tracks from raccoon and striped skunk. Feral cat tracks lacked parameters "E", "B", "F" and "G". For cottontail rabbits, only parameters "F" and "I" were present and measured. Parameter "B" was not present on any track from squirrels. In addition, parameter "G" was not present on any hind-foot track from squirrels and parameter "E" was not present on chipmunk or red squirrel tracks and measurable on only 16 Eastern gray squirrel tracks. Parameter "F" was measurable on only low numbers of hind-foot tracks of squirrels. Because a number of parameters were not present, were measured on only a relatively few tracks or were present on only front-foot tracks, parameters used to assess the reliability of species identifications were limited to "A", "B", "C", "G" and "H" for weasel species and "A", "C", "D", "H", and "I" for squirrel species.

Mean measurements for front-foot tracks were similar to those for hind-foot tracks for weasel species (Tables 8, 9, 10, and 11). Most mean measurements for mink were markedly larger than comparable means for ermine or those for tracks initially identified as from long-tailed weasel (Tables 8, 9, and 10). Mean measurements for possible long-tailed weasel were generally marginally larger than comparable means for ermine (Tables 9 and 10). For tracks initially identified as from long-tailed weasel and positively identified as either from a front or a hind foot, nine tracks were subsequently identified as possibly from mink; the remaining nine tracks were identified as possibly from ermine. Minimum measurements for parameters of fisher tracks were either greater than or only slightly less than the maximum for comparable measurements of mink tracks (Tables 8 and 11).

Measurable parameters and mean measurements for front-foot tracks were considerably different from those for hind-foot tracks from raccoon, striped skunk and Virginia opossum (Tables 12, 13 and 14). Three fewer parameters were present on hind-foot tracks than on front-foot tracks from raccoon and striped skunk. Six parameters were present on both front- and hind-foot tracks of opossum; mean measurements for hind-foot tracks were consistently greater than corresponding means for front-foot tracks. For raccoons and opossums, parameter "E" was measurable on front-foot tracks at a relative

frequency of only approximately half that of other front-foot parameters or parameter "E" on hind-foot tracks. Front-foot tracks of feral cat could not be distinguished from high-foot tracks; however, five parameters were measured on most tracks (Table 15). Only two parameters were present on cottontail rabbit tracks (Table 16). The mean of parameter "F" for hind-foot tracks was considerably larger than that for front-foot tracks of rabbits, whereas the mean of parameter "I" for hind-foot tracks was similar to that of front foot tracks.

Mean measurements for front-foot tracks were considerably different from those for hind-foot tracks from red squirrels, Eastern chipmunks and Eastern gray squirrels (Tables 17, 18 and 19). For all squirrel species, parameters "F" and "G" were not present on front- and hind-foot tracks, respectively. Parameter "F" was measurable on only a few hind-foot tracks of each squirrel species. Parameter "E" was measured on only half to three-quarters of the front-foot tracks of squirrel species and on only a few hind-foot tracks of Eastern gray squirrels. For all squirrel species, mean measurements for hind-foot tracks were greater than corresponding means for front-foot tracks.

Combinations of missing measurements were summarized for the most frequently measured parameters ("A", "B", "C", "G" and "H") of weasel species (Table 20). Fifty-five percent of the weasel tracks that were positively identified as to foot origin had a complete a set of measurements for five parameters. Tracks that lacked the measurement combinations "ACGH", "C", "AC", and "G" comprised most of the tracks with missing measurements (31% of total tracks measured) with each combination of missing measurements accounting from 3.1 to 14.6% of the total number of tracks measured. Of the five parameters measured, parameters "C" and "G" were missing the most frequently (34.1% of tracks) and the second most frequently (25.0% of tracks), respectively. Also, most tracks missing a measurement for parameter "C" were also missing a measurement for parameter "A" (21.9% of tracks). If tracks of weasel species that could not be identified as to foot origin are included in the frequency distribution of measurement combinations, 46% of the weasel tracks had a complete a set of measurements for five parameters (Table 21). The frequency distribution for combinations of missing measurements for weasel tracks that included tracks that could not be identified as to foot origin were similar that for tracks that included only tracks that could be positively identified as to foot origin (Tables 20 and 21).

Combinations of missing measurements were summarized for the most frequently measured five parameters ("A", "C", "D", "H" and "I") of squirrel species. Eighty-four percent of the squirrel tracks had a complete a set of measurements for five parameters (Table 22). Tracks that lacked the measurement combinations "I", "CDH", "ACDH", "D" and "ACD" comprised most of the tracks with missing measurements (14% of total tracks measured) with each combination of missing measurements

accounting from 1.1 to 5.0% of the total number of tracks measured. Of the five parameters measured, parameters "D" and "I" were missing the most frequently (9. 9% of tracks) and the second most frequently (6.7% of tracks), respectively. Also, most tracks missing a measurement for parameter "D" were also missing a measurement for parameter "C" (7.8% of tracks).

Identification of Squirrel and Weasel Tracks

In order to assess the reliability of identifications of squirrels and weasels to species, the degree of error in classification of identified individuals was determined relative to statistically determined grouping of tracks generated from measurement criteria. Also, the effect of including tracks that have statistically estimated values for one or more missing measurements on the reliability of species-level identification was evaluated for weasels and squirrels. Analyses were conducted for weasel and squirrel tracks that had measurements for five parameters ("A", "B", "C", "G" and "H"; weasel species) and ("A", "C", "D", "H" and "I"; squirrel species). Missing values for parameters were estimated using predicted values generated from specific multiple regression models according to methods outlined by Hatcher and Stephanski (1994). A multiple regression model was generated using variables with measurements as predictor variables and variables with missing values as criterion variables for each combination of missing variables. Missing values for measurements were assigned the corresponding predicted value for each track observation with missing values. Regressions were generated independent of species identifications for squirrels and weasels. Because the number of tracks on the sooted portion of the track plate was small and the difference between "positive" vs. "negative" imprints results in inconsistent track measurements, only tracks appearing on shelving paper were included in the statistical summary for weasels.

Discriminant analyses were conducted to determine if tracks grouped according to measurement criteria by discriminant function supported the identification of tracks to species for squirrels and weasels. In addition, discriminant analyses were conducted for weasels to determine the effect of including or removing long-tailed weasels as an identified species on the discriminant function. Discriminant functions were evaluated for a dataset that contained tracks initially identified as possibly from long-tailed weasels and for a dataset with tracks initially identified as long-tailed weasels subsequently identified as either mink or ermine. The assumption of multivariate normality for track measurement data was not met as indicated by univariate and multivariate tests of normality and quantile-quantile plots of squared and ordered Mahalanobis distances (Sharpiro-Wilk and Marida tests, respectively; Hatcher and Stepanski, 1994; Khattree and Naik, 2000; Appendix II). Consequently, non-parametric methods of discriminant

analysis were employed (Khattree and Naik, 2000). Because no systematic method exists for the selection of non-parmetric methods for discriminant analyses or their parameterization, selection of methods and parameters was made empirically. Two methods were considered: the Kernel and the k-Nearest-Neighbor. Discriminant analyses were conducted using the Epanechnikov kernel function with radii of r=1.75, 2.75 and 4 with the pool option specified as non proportional. Similarly, discriminant analyses were conducted using the k-Nearest-Neighbor method with the k=1, 2, 3 and 4 with the pool options specified as proportional. Initial measurement data was divided into independent datasets for training (calibration) and test (validation) data by randomly assigning approximately half the tracks and associated measurements to each dataset. Classification error was estimated by cross-validation using the independent test dataset, thus producing an unbiased estimate of error. Effects were evaluated by comparing classification error within the test dataset for the assignment of individual tracks of species to species groups derived from a discriminant function. Although each method generated similar trends, the k-Nearest-Neighbor with k=1 generated the lowest error rates for both training and test data and, thus, the results of this method were reported.

Classification error for the assignment of individual tracks of species to species groups derived from the discriminant function was low for squirrel species (Table 23). The total error rate was 0.072; error rates for individual species were 0.052, 0.157 and 0.034 for Eastern gray and red squirrels and Eastern chipmunks, respectively. Classification error for the assignment of individual tracks of species to species groups was greater for the discriminant function when possible long-tailed weasel identifications were included than when long-tailed weasels were subsequently identified and included as ermine or mink (Tables 24 and 25). Total error rate was reduced from 0.168 to 0.043 with the re-identification of long-tailed weasels to mink or ermine. Moreover, a high rate of error (0.600) was observed for the assignment of individual tracks identified as long-tailed weasels to the corresponding species group derived from a discriminant function. Error rates for ermine, mink and fisher (0.000, 0.156, and 0.000, respectively) for the discriminant function restricted to tracks identified as ermine, mink or fisher were similar to those (0.167, 0.029 and 0.000, respectively) for the discriminant function that included long-tailed weasel identifications. Identifications of squirrel species and weasels species other than long-tailed weasel are supported by discriminant functions that group tracks according to measurement criteria. High misclassification rates for the discriminant function including long-tailed weasel indicate that long-tailed weasel identifications are not reliably associated with a specific group derived from the discriminant function. These relationships suggest that the identification of long-tailed weasels as a possible source of tracks at scent stations is not supported by criteria based on track measurement.

A number of discriminant analyses were conducted to determine the effect of tracks with one or more estimated measurements on the classification of tracks of species to groups derived from a discriminant function. A discriminant analysis was conducted for dataset that included both tracks without estimated and with one or more estimated measurements. The training dataset consisted of a random sample of approximately half the tracks; the remaining tracks comprised the test dataset. Potential increases in misclassification of tracks due to the inclusion of tracks with estimated measurements were evaluated by comparing error rates for the test dataset to those of the initial discriminant analysis of tracks without estimated measurements. Two additional discriminant analyses were conducted to assess whether a discriminant function derived from data that did not include tracks with estimated measurements was sufficient (did not result in an increase in error rate) for evaluating track data with one or more estimated measurements. Tracks with no estimated measurements for any of the five parameters comprised the training dataset for these discriminant analyses. One analysis used a training dataset consisting of all available tracks without estimated measurements; tracks with one or more estimated measurements comprised the test dataset. The second analysis used a training dataset consisting of a random sample of approximately half the tracks with measurements for all five parameters and, as in the first analysis, tracks with one or more estimated measurements comprising the test dataset. Potential increases in misclassification due to tracks with estimated measurements were evaluated by comparing error rates for the test dataset to those of the test dataset of discriminant function derived from the initial discriminant analysis for the dataset that included both tracks without estimated and with one or more estimated measurements.

For the three datasets examined: squirrels, weasels including long-tailed weasel identifications and weasels with long-tailed weasels re-identified as either mink or ermine, error rates for discriminant functions for datasets that included estimated measurements (Tables 26, 27, and 28) were similar to or slightly greater than error rates for discriminant functions for datasets that included only tracks with all five measurements (Tables 23, 24 and 25). Total error rates classification for squirrels, weasels including long-tailed weasel identifications, and weasels with long-tailed weasels re-identified as either mink or ermine were 0.083, 0.186 and 0.055 for each dataset, respectively; comparable error rates were 0.072, 0.186, and 0.043, respectively, for datasets restricted to tracks with all five measurements. The small increase in error rates suggests that inclusion of tracks with estimated measurements in the dataset produces a discriminant function that that supports identification of tracks by species nearly as well as a function based only on tracks with all five measurements. However, a discriminant function derived from a dataset containing only tracks with all measurements may not be sufficient to evaluate data containing

tracks with estimated measurements. Total error rates (test data) for discrimiant functions derived from data restricted to tracks without estimated measurements for training and tracks with estimated measurements for test data (Tables 29 and 31) were substantially greater than total error rates for discriminant functions derived when both training and test data contained tracks with estimated measurements (Tables 26 and 28). For squirrels and weasels, total error rates were 1.6 and 2.6 times greater, respectively. The increase in error rates suggests that discriminant functions based solely on tracks without estimated measurements cannot be applied to datasets containing tracks with estimated measurements without increased error in classification. Consequently, any discriminant function applied to the verification of species identification should include data with estimated measurements (probably with the same distribution for combinations of missing parameters). Discriminant functions derived for evaluating species identification are likely to be unique to individual datasets.

Visitation to Scent Stations by Animals

Scent stations were visited by expected species and taxonomic groups with the exception of fox and muskrat (Table 3). As a group, mice, shrews and voles were the most frequent visitors to scent stations. Visits from squirrels as a group (three species) were also high in frequency. Found at moderate frequencies, were visits from raccoons, opossums, feral cats, frogs, rabbits, salamanders, and weasel species as a group. Visits from striped skunk and birds were at relatively low frequencies. The frequency of mink visits was greater than those from ermine, fishers or possibly from long-tailed weasels. For all species and taxonomic groups visiting track-plate enclosures, 73 to 100% of tack imprints were on shelving paper (Table 4).

In addition to visitation documented as track records on track plates, visitation data also included observations of mink at stations and mink tracks in snow or mud observed near stations. Two observations of mink in the vicinity of scent stations during monitoring visits were included in the summary: 1) station 15 (near Mohawk) on October 24, 2000 (nominal week 4) and 2) station 50 (far Hudson) on March 1, 2001 (nominal week 22). No record of mink tracks were observed at the stations on the dates when mink were observed. Tracks were observed near scent stations on a number of monitoring visits when mink tracks were not evident on track plates. Tracks in snow or mud near scent stations were observed during two monitoring visits during the fall period: 1) station 51 (far Mohawk) on December 11, 2001 (nominal week 11) and 2) station 68 (far Mohawk) on December 7, 2000 (nominal week 10). During the spring period, tracks were observed in snow near scent stations during 30 monitoring visits when mink tracks were not present on track plates. Most of these observations were made on dates in March, 2001.

Summarization of Visitation Data

Visitation by species or taxonomic groups was summarized as a frequency distribution for stations categorized by to the specific number of repeat visits to stations. Distributions were calculated for each locational category (near-Hudson, far Hudson, near-Mohawk, far-Mohawk) within each monitoring period (fall, spring). A categorical analysis of visitation frequencies using Chi-square (χ^2) was conducted for each species or taxonomic group. Visitation was categorized by the number of stations never visited versus the number of stations visited one or more times during a monitoring period. Chi-square tests were performed to determine the independence of visitation relative to drainage (Hudson, Mohawk) for near-station and far-station categories. Visitation rates (number of visits by a species per number of stations monitored during each weekly date) were also summarized as cumulative visitation rates for each species or taxonomic group. Visitation was expressed as a rate due to the variation in the number of stations monitored on each date. Cumulative visitation rates were determined for each locational category within each monitoring period.

For mink, individual summaries and analyses for visitation frequency included 1) only record from track plates, 2) observations of mink in addition to record from track plates, and 3) snow or mud track observations and observations of mink in addition to visitation data from track plates. For other species or taxonomic groups, only record from track plates was summarized. Summarization and analysis were also conducted for visitation frequencies of mink and ermine that included the possibility of additional mink or ermine visits attributed initially to long-tailed weasels.

Mink Visitation

The relative frequency of visitation by mink as documented by track record on track plates was similar for all locational categories within seasonal periods with the exception of the near-Hudson during the fall period (percentages calculated from frequencies in Table 32). Approximately half the stations in each category (41 to 57%) were never visited by mink during either monitoring period with the exception of the near-Hudson category which had a considerably higher percentage of stations never visited by mink (77%) during the fall period. In addition, the frequency distributions for stations categorized according to the specific number of repeat visits by mink were similar for locational categories during both monitoring periods with the exception of the near-Hudson during the fall period (Table 32). The near-Hudson category lacked stations having only a single visit by mink; all of the stations had multiple visits. In contrast, stations that were visited only once largely comprised the mink visitation for the other

locational categories; only 20 to 42% of the stations with mink visits had multiple visits (from 3 to 4 and from 2 to 5 stations had multiple visits within each locational category during the fall and spring periods, respectively).

The addition of observed mink (two observations) to the frequency summary did not substantially alter the relationships among frequency distributions that were apparent when only track-plate data were considered (percentages calculated from frequencies in Table 32). The percentage of stations never visited by mink remained at 77% for the near-Hudson category and at 41 to 57% for the other locational categories. The near-Hudson stations during the fall period still lacked stations that were visited only once by mink. The percentage of stations within a locational category with mink visits that had multiple visits remained at a range of 20 to 42%.

Similarly, the addition of mink tracks observed in snow or mud (during two and 30 monitoring visits in the fall and spring periods, respectively) did not substantially alter the relative relationships among frequency distributions for locational categories even though the number of stations never visited by mink was reduced by one (3%) and by ten (28%) during the fall and spring periods, respectively (percentages calculated from frequencies in Table 32). The percentage of stations never visited by mink remained at 77% for the near-Hudson during the fall period and was reduced, for other locational categories, only slightly by additional track observations (from a range of 41 to 57% to a range 29 to 50%). When additional track observations were included in the frequency summary, the percentage of stations visited by mink that were visited multiple times within each location category and monitoring period was consistent with the summary without the additional observations: a range of 33 to 50% with additional observations versus 20 to 40% without the observations for categories other than the near-Hudson in the fall which remained at 100%.

Visitation frequencies for mink were also summarized to include the possibility of additional mink visits that had been attributed initially to long-tailed weasels (Table 33). As for the initial visitation summaries for mink, the second set included individual summaries for the following observations: 1) only from track plates, 2) of mink in addition to track plates, and 3) of snow or mud tracks and mink in addition to track plates. Eight additional observations of possible mink visits (5 and 3 records on track plates during the fall and spring periods, respectively) were included in a second set of summaries. These observations were at stations that did not otherwise have evidence of mink visitation as tracks on track plates identified initially as mink, as observed mink, or as mink tracks in the vicinity of scent stations. The additional observations did not alter the number of stations never visited by mink within each

locational category and seasonal period with the exception of a one-station reduction in the far-Mohawk category during the fall period. Most of the additional possible mink tracks occurred at stations that had evidence of one or more mink visits at other times during the monitoring period. These additional tracks did not change appreciably the percentage of stations visited by mink or the percentage of stations that were visited multiple times: 20% to 50% (versus 20% to 42%), 30% to 50% (versus 20% to 42%), 42% to 50% (versus 33% to 50%) for summaries including only observations from track plates, observations of mink in addition to track plates, and observations of snow or mud tracks and mink in addition to track plates, respectively, (versus summaries based on tracks identified from mink without including possible mink visits initially attributed to long-tailed weasels). Summaries of visitation frequencies that included possible mink visits attributed initially to long-tailed weasels were not appreciably different from those without the additional visits.

The categorical analyses for mink suggest that visitation for the near-station category was not independent of drainage indicating a trend towards reduced visitation by mink at near-Hudson stations during the fall period. The χ^2 probabilities (Prob = 0.177 for the analysis of observations on track plates and Prob = 0.098 for the analyses that included additional observed mink or additional observed mink and mink tracks near scent stations) for evaluation of independence of visitation relative to drainage for the near-station category were considerably lower than χ^2 probabilities for far-stations during the fall (Prob = 0.894) or for categorical analyses made for the spring period (χ^2 probabilities Prob = 0.576 and Prob = 0.491 for near- and far-station categories, respectively; Table 34). Relative visitation (23% of stations visited one or more times) for the near-Hudson category was approximately half that of visitation (47% of stations visited one or more times) for the near-Mohawk category during the fall period. Moreover, visitation for all locational categories except for the near-Hudson during the fall period was remarkably similar for mink: 47% for the near-Mohawk during the fall period, 50 and 48% for far-stations within the Hudson and Mohawk drainages, respectively, during the fall period, and, during the spring period, 43%, 53%, 59% and 48% for the near-Hudson, near-Mohawk, far-Hudson and far-Mohawk, respectively. The inclusion of observed mink and mink tracks near scent stations as visitations did not appreciably alter the results for categorical analyses of visitation for mink (Table 34). Nor were results of analyses of visitation that included possible mink visits attributed initially to long-tailed weasels appreciably different from those without the additional visits (Table 35).

Patterns of cumulative visitation with time for mink were similar between drainages within each distance category (far, near) during the fall (Fig. 12). However, the pattern of cumulative visitation for near stations differed from that for the far stations. An extended period without mink visitation to any

station was observed at the near-stations during the fall period (constant cumulative visitation rate, nominal weeks 7 to 10 and 8 to 11 for Mohawk and Hudson drainages, respectively; Fig. 12). During the spring period, extended periods without mink visitation to any station were observed only within the Hudson drainage (constant cumulative visitation rate, nominal weeks 4 to 7 and 8 to 10 for near and far stations, respectively; Fig. 12). The inclusion of observed mink near scent stations as visitations did not appreciably alter patterns of cumulative visitation (Fig. 13). The inclusion of observed mink and mink tracks near scent stations as visitations did not appreciably alter patterns of cumulative visitation with the exception of an increase in cumulative visitation during nominal weeks 8 to 10 at far stations in the Hudson drainage during the spring (Fig.14). Patterns of cumulative visitation that included possible mink visits attributed initially to long-tailed weasels were not appreciably different from those without the additional visits (Figs. 15, 16 and 17).

Other Weasel Species

Ermine visited a greater percentage of stations within each locational category during spring (24 to 58%) than fall period (8 to 25%, percentages calculated from frequencies in Table 36). The increase in visitation by ermine during the spring period was associated with an increase in the percentage of stations that had multiple visits (32 versus 10%, spring and fall, respectively). The inclusion in the summary of the possibility of eight additional ermine visits initially attributed to long-tailed weasel did not alter the number of stations never visited by ermine for locational categories within monitoring periods with the exception of a single-station decrease within each of the far-Hudson and far-Mohawk categories during the spring period (Table 36). Consequently, most of these additional visits only increased the number of visits at stations visited multiple times with little effect on the total number stations visited by ermine. The summary of visitation by ermine was not substantially altered by the inclusion of additional possible visits attributed initially to long-tailed weasel.

Visits by probable long-tailed weasel and fisher were relatively infrequent (percentages calculated from frequencies in Tables 37 and 38). Probable long-tailed weasel visited only 0 to 18% of the stations within each locational category and monitoring period and only four stations were visited multiple times. For fisher, visits to stations were few, ranging from 0 to 36% of the stations within each locational category during monitoring. Visitation by fisher at Mohawk stations was lower than Hudson stations. Near-Mohawk stations were never visited during the fall period and only 4 and 8% of the far-Mohawk stations were visited in the fall and spring periods, respectively. In contrast, in the Hudson drainage, fisher visited 6 to 36% of the stations within each locational category and monitoring period.

The categorical analyses for ermine and probable long-tailed weasels indicate visitation was independent of drainage for both near or far categories during both monitoring periods (Prob > 0.05 for χ^2; Tables 39 and 40). Also, results for ermine were not substantially altered by the inclusion of additional possible visits attributed initially to long-tailed weasel (Table 39). In contrast, for fisher, significant probability for χ^2 for the near-station category during both fall and spring periods (Prob = 0.037 and Prob = 0.007 [$\alpha = 0.05$] for fall and spring periods, respectively) indicate visitation was not independent of drainage suggesting that visitation by fisher was reduced at near stations within the Mohawk drainage during both fall and spring periods (Table 41). A nearly significant probability for χ^2 (Prob = 0.068 [$\alpha = 0.05$]) suggests that visitation for the far-station category was not independent of drainage during the spring period. The near-significant result suggests a trend toward reduced visitation for far stations within the Mohawk drainage during the spring period. The lack of a significant probability for χ^2 for the far-station category during the fall may be due to the low visitation frequencies for both drainages (one station visited in each drainage; Table 41). Although several trends are evident, the low frequencies (equal to or less than five) for ermine visits within locational categories during the fall period and for long-tailed weasel and fisher visits in all categories during both monitoring periods may affect the reliability of the analyses.

Patterns of cumulative visitation for ermine were similar between drainages within each distance category (far, near) during the fall period (Fig. 18). However, the pattern of cumulative visitation for near stations differed from that for far stations; additional visits were observed after nominal week eight at far stations (Fig. 18). The pattern of cumulative visitation did not vary substantially among locational categories for ermine during the spring period (Fig. 18). Patterns of cumulative visitation that included possible ermine visits attributed initially to long-tailed weasels were not appreciably different from those without the additional visits (Fig. 19).

No noticeable variation in the pattern of cumulative visitation for long-tailed weasel was evident during the fall possibly due to low visitation rates (Fig. 20). However, during the spring, cumulative visitation rates for long-tailed weasel were greater at near-Mohawk than near-Hudson stations (not visited at all during the monitoring period) but were similar between drainages at far-stations (Fig. 20). For fisher, cumulative visitation increased at a greater rate in the Hudson than Mohawk drainage. The increase in cumulative visitation for fisher was more pronounced for the near-Hudson than other locational categories during the fall period and was markedly greater for both near- and far-station categories within the Hudson as compared with the Mohawk drainage during the spring period (Fig. 21).

Squirrels

Each squirrel species (Eastern chipmunk, red and Eastern gray squirrels) visited a similar percentage of stations among locational categories within each monitoring period (percentages calculated from frequencies in Tables 42, 43, and 44). Eastern chipmunk visited a greater percentage of stations during the fall than spring period (percentages calculated from frequencies in Table 42). The range for the percentage of stations within a locational category receiving at least one visit during the fall period was 75 to 94% in contrast to 41 to 65% during the spring period. The percentage of stations visited by red and Eastern gray squirrels, in contrast to chipmunks, was generally similar between monitoring periods (percentages calculated from frequencies in Tables 43 and 44). Twenty-five to 38% and 46 to 61% of stations within a locational category received at least one visit from red and gray squirrels, respectively, during the fall period; similar ranges, 29 to 65% and 50 to 73% for red and gray squirrels, respectively, were observed during the spring period. Maximums of 11 visits per station for both red and gray squirrels and a maximum of nine visits per station for chipmunk were observed at a minimum of one station for each species during monitoring. For stations receiving visits within a locational category during either monitoring period, the percentage of stations with multiple visits ranged from 29 to 100%, 46 to 76% and 50 to 89% of the stations for red and gray squirrels and chipmunk, respectively.

The categorical analyses for chipmunk and red and gray squirrels indicated visitation was independent of drainage for both near or far categories during both monitoring periods (Prob > 0.05 for χ^2; Table 45). However, the low frequencies (five or less) of stations without chipmunk visits within all locational categories during the fall period and low frequencies of red squirrel visits to near-Hudson stations during the fall may affect the reliability of the analyses.

The pattern of cumulative visitation did not vary noticeably among locational categories for chipmunk during the fall period (Fig. 22). Patterns of cumulative visitation for chipmunk were similar between drainages for distance categories (near, far) during the spring period (Fig. 22). However, cumulative visitation rates were lower at near stations than far stations after nominal week six within both drainages during the spring (Fig. 22). For red squirrel, the near-Mohawk category had consistently lower cumulative visitation rates than other locational categories during both monitoring periods (Fig. 23). The pattern of cumulative visitation did not vary greatly for gray squirrel during either monitoring period (Fig. 24).

Other mammals

Raccoon, feral cat, rabbit, and striped skunk visited a similar percentage of stations between drainages within each distance category (near, far) during both monitoring periods (percentages calculated from frequencies in Tables 46, 47, 48 and 49). Virginia opossum visited a reduced percentage of stations for both near and far categories (61 versus 94% and 25 versus 65%, near and far categories, respectively) within the Hudson drainage during the fall period but visited a similar percentage between drainages within each distance category (14 versus 24% and 12 versus 8%, near and far categories, respectively) during the spring period (percentages calculated from frequencies in Table 50). Raccoon, opossum, feral cat, rabbit, and striped skunk visited a generally greater percentage of stations during the fall than spring period. Ranges for the percentages of stations receiving at least one visit within a locational category during the fall period were 50 to 69%, 25 to 94%, 62 to 77%, and 25 to 94% for raccoon, opossum, feral cat, and rabbit, respectively, and reflect ranges comprised of generally higher percentages than comparable ranges for the spring period (14 to 40%, 8 to 24%, 24 to 36%, and 12 to 35% for raccoon, opossum, feral cat, and rabbit, respectively). Maximums of 10, 9, 8 and 7 visits per station by raccoons, opossums, feral cats, and rabbits, respectively, were observed at a minimum of one station for each species during monitoring. For stations receiving visits, the percentage of stations with multiple visits ranged from 20 to 100%, 25 to 100%, 25 to 83% and 0 to 100% of the stations within each locational category during monitoring for raccoon, opossum, feral cat, and rabbit, respectively. Likewise, striped skunk visited a greater percentage of stations during the fall than the spring period, but the percentage was lower than for other medium-sized mammals. Striped skunk visited from 6 to 26% and 0 to 36% of the stations within each locational category during fall and spring periods, respectively. Moreover, no stations received multiple visits and only near stations were visited at any time by striped skunk during the spring period. In contrast to medium-sized mammals, visitation frequencies were greater for small mammals; multiple visits (as indicated by indistinguishable tracks of mice, shrews and voles) were evident at all stations (Table 51). Seventeen stations had a maximum of 11 visits and 11 stations had a maximum of 12 visits by small mammals during the fall and spring periods, respectively.

The categorical analyses for raccoon, feral cat, rabbit, and striped skunk indicates visitation was independent of drainage for both near and far categories during both fall and spring periods (Prob > 0.05 for χ^2; Tables 52, 53, 54 and 55). Low frequencies (five or less) within a number of locational categories may affect the reliability of χ^2 analyses for raccoon, feral cat, rabbit, and striped skunk (Tables 52, 53, 54 and 55). Low frequencies were observed generally during the spring period for raccoon, feral cat, and rabbit; whereas, for striped skunk, frequencies were low in nearly all categories during both monitoring

periods. In contrast to other medium-sized mammals, significant probabilities for χ^2 indicate that visitation by opossum was not independent of drainage for both near- and far-station categories suggesting that visitation was reduced at stations within the Hudson drainage during the fall period (Prob = 0.027 and Prob = 0.014 [$\alpha = 0.05$] for χ^2, near and far categories, respectively; Table 56). The lack of significant probabilities for χ^2 during the spring period suggests visitation by opossum were independent of drainage during the spring (Prob > 0.05 for χ^2; Table 56). However, low frequencies (equal to or less than five) for opossum visits within locational categories during the spring period may affect the reliability of the analyses.

The pattern of cumulative visitation did not vary noticeably among locational categories for raccoon, rabbit or small mammals during either monitoring period or for feral cat during the fall (Figs. 25, 26 and 27). Rabbits visited little after weeks four and six at far and near stations within either drainage during the spring period (Fig. 26). Feral cats did not visit for an extended period (week 9 to 11) stations within the Hudson drainage during the spring period (Fig. 27). For striped skunk, little visitation was evident at far stations in either drainage after week five although cumulative visitation continued at a low constant rate at near stations during the fall period (Fig. 28). Similarly, striped skunk did not visit far stations in either drainage and only visited near stations at low cumulative rates during the spring period (Fig. 28). Cumulative visitation for opossum was lower at stations in the Hudson than the Mohawk drainage during the fall period; however, the pattern of cumulative visitation did not vary among locational categories during the spring period (Fig. 29).

Amphibians

Frogs and salamanders visited stations only during the fall period. Comparable ranges for percentages of stations visited within each locational category were visited by frogs and salamanders (56 to 71% and 56 to 70%, respectively; percentages calculated from frequencies in Table 57). For stations receiving visits within each locational category, the percentage of stations with multiple visits ranged from 33 to 79% and 64 to 88% of the stations for frogs and salamanders, respectively. Maximums of 5 and 6 visits per station by frogs and salamanders were observed at a minimum of one station for each species during monitoring. The categorical analyses for frogs and salamanders indicate visitation was independent of drainage for both near or far categories (Prob > 0.05 for χ^2; Table 58). Low frequencies (five or less) may affect the reliability of analyses for frogs at near stations.

The pattern of cumulative visitation did not vary among locational categories for salamanders; however, patterns of cumulative visitation for frogs were different between drainages (Fig. 30).

Although visitation by frogs continued until week nine in the Hudson drainage, frogs did not visit stations in the Mohawk drainage after week five during the fall period.

Birds

The percentage of stations visited by birds was low (percentages calculated from frequencies in Table 59). Eleven to 24% of the stations received at least one visit within each locational category during the fall period but only 0 to 8% during the spring period. A maximum of three visits per station was observed at two stations during monitoring. The categorical analyses for birds indicated visitation was independent of drainage for both near or far categories during both monitoring periods (Prob > 0.05 for χ^2; Table 60). Low frequencies (five or less) may affect the reliability of all categorical analyses. The pattern of cumulative visitation for birds did not vary among locational categories during either monitoring period (Fig. 31).

SUMMARY

We conducted a study to evaluate whether visitation of mink and other species to scent stations can serve as an index to their relative abundance. Scent stations were generally located at stream-road intersections on tributary streams in the upper Hudson River and Mohawk River drainages. Scent stations were located at two nominal distances from the main-stem of each river: less than 6 km (near stations) and equal to or greater than 6 km (far stations). Mink visiting stations less than 6 km from the main-stem river were considered to have home ranges adjacent to the main-stem river. In contrast, mink visiting stations equal to or greater than 6 km from the main-stem river were considered to have home ranges disjunct from the main-stem river. Typically, scent stations were monitored weekly from October 3, 2000 until April 5, 2001. Track imprints on track plates provided evidence of visitation by mink and other species. Mammal tracks were identified and measured. We summarized monitoring data, track measurement data and visitation frequencies for species.

Monitoring

The initial set-up of scent stations could not be accomplished on schedule for all stations and a number of stations were removed, relocated or added during the study period. Also, not all track plates could be examined or recovered during scheduled weekly monitoring due to flooding, snow cover, lack of access, vandalism etc. A loss of record resulted when stations were not in place or could not be examined

on monitoring dates. In order to minimize the effects of lost record on the summarization of visitation by species, monitoring dates that had lost record for a large proportion of stations were deleted from the data summary. This resulted in monitoring record for two discrete seasonal periods: nominal weeks 1 to 11 (10/03/00 to 12/12/00), representing the fall and early winter (fall monitoring period) and nominal weeks 15 to 26 (1/9/01 to 3/27/01), representing the late winter and spring (spring monitoring period). Although monitoring dates within each period had a high proportion of stations with record, some loss of record was still evident.

To evaluate the effect of lost record on monitoring, the percentage of record was calculated for each locational category (near Hudson, near Mohawk, far Hudson, and far Mohawk) within each monitoring period. Percentages were calculated based on the number weekly monitoring visits to stations that resulted in a record (presence of tracks or capable of recording tracks) relative to the maximum number of records potentially available (stations times weeks within each category). A high percentage (greater than 79%) of scheduled monitoring visits to stations within each category during both monitoring periods yielded a complete record for both track plates. The percentage of monitoring visits that produced record was greater for both near and far categories in the Mohawk River drainage than for comparable categories in the Hudson during both monitoring periods. However, the difference between drainages in the percentage of record for the near-station category was similar to the difference for the far-station category within each monitoring period.

The relative number of stations having potential reduction in visitation at stations at some time during the week due to flooding or snow cover was also summarized. Enclosures that were initially capable of recording tracks (and thus providing record) but were found snow-covered without access to the track plate or exhibited evidence that flooding may have reduced visitation at some time during the week were noted. The percentage of record compromised by snow or flooding was less than 10% within each locational category during the fall. The percentage of record compromised by snow or flooding remained under 10% for near and far categories within the Mohawk River drainage but increased to nearly 20% for comparable categories within the Hudson during the spring period.

Track Measurements

Tracks from seventeen species or taxonomic groups were recorded on track plates. A total of 2047 tracks from medium-sized mammals were imprinted on shelving paper and measured; 258 of these tracks were from weasel species (mink, fisher, ermine or long-tailed weasels). An additional 36 tracks

from weasel species that made imprints only on the sooted portion of the track plate were also measured. Mink comprised the largest percentage of weasel tracks measured (44 and 75% on shelving paper and soot, respectively). A total of 1237 tracks from squirrel species (Eastern chipmunk, red and Eastern gray squirrels) were imprinted on shelving paper and measured. The number of tracks ranged from 36 to 161 for each of the remaining medium-sized mammal species. For most species, tracks were positively identified as either from front or hind foot. In contrast, front-foot tracks were not distinguishable from hind-foot tracks for feral cats. Also, 25% of mink tracks could not be identified positively as to foot origin; for other weasel species, approximately half the tracks could not be positively identified as to foot origin. Of the nine parameters proposed for measurement, not all were present for each species (or foot) or could be measured at frequencies considered useful. Because a number of parameters were not present, were measured on only a relatively few tracks or were present on only front-foot tracks, parameters used in the summary of the association of statistically generated track groups and species identifications were limited to five parameters each for weasel and squirrel species. Fifty-five and 84% of the weasel and squirrel tracks, respectively, positively identified as to foot origin had a complete set of measurements for the five selected parameters. Tracks for species other than weasels or squirrels had sufficiently unique diagnostic characteristics to preclude a quantitative evaluation of measurement criteria to support their identification.

Identification of Squirrel and Weasel Tracks

In order to assess the reliability of identifications of squirrels and weasels to species, the degree of error in classification of identified individuals was determined relative to statistically determined groups generated from measurement criteria for tracks. Discriminant analyses were conducted to determine if tracks grouped according to measurement criteria by discriminant function supported the identification of tracks to species for squirrels and weasels. Classification error for the assignment of individual tracks of species to species groups derived from the discriminant function was low for squirrel species. Classification error for the assignment of individual tracks of species to species groups was greater for the discriminant function when long-tailed weasel identifications were included than when possible long-tailed weasels were subsequently identified and included as ermine or mink. Total error rate was reduced to a relatively low level with the re-identification of long-tailed weasels as mink or ermine. Moreover, a high rate of error was observed for the assignment of individual tracks identified as long-tailed weasels to a corresponding species group derived from a discriminant function. Identification of squirrel species and weasels species other than long-tailed weasel is supported by discriminant functions that group tracks according to measurement criteria. High misclassification rates for the

discriminant function including long-tailed weasel indicate that long-tailed weasel identifications are not reliably associated with a specific group derived by discriminant function. These relationships suggest that the identification of long-tailed weasels as a possible source of tracks at scent stations is not supported by track measurements.

The lack of a strong statistical relationship to support for the identification of tracks believed to be from long-tailed weasels have a number of interpretations with regard to the presence or absence of visitation by long-tailed weasels to scent stations. The lack of a statistical relationship between tracks initially identified as long-tailed weasels and measurement criteria may be due to the lack of long-tailed weasel tracks in the sample. Although long-tailed weasels are present in the study area, the riparian habitat in which scent stations were located may have not been occupied by long-tailed weasels. If long-tailed weasels are actually present in the track sample and correctly identified, the measurement criteria may not be sufficiently unique from other species to permit a statistical differentiation. Or if long-tailed weasels are actually present in the track sample but incorrectly identified due to the use of criteria (either subjective or quantitative) that are not diagnostic for the species, measurement criteria may not result in differentiation of those tracks from other species. The source of tracks of uncertain origin cannot be resolved without more information on diagnostic characteristics of tracks from weasel species. Consequently, visits by weasel species to scent stations are summarized according to two conditions: 1) with tracks initially identified as possibly from long-tailed weasels and 2) with these tracks re-identified as mink or ermine.

Mink Visitation

Mink visitation, as documented by record from track plates, was similar for all locational categories within both monitoring periods with the exception of near-Hudson stations during the fall period. The percentage of stations (77%) never visited by mink in the near-Hudson category during the fall period was considerably greater than that for the near-Hudson category during the spring or for other categories during either monitoring period (41 to 57% of the stations within each category). In addition, the frequency distributions of visits to stations categorized according to the specific number of repeat visits by mink were similar for categories other than the near-Hudson during the fall period. The near-Hudson category lacked stations that had only a single visit by mink during the fall period; all of these stations had multiple visits. In contrast, stations that were visited only once largely comprised the mink visitation within locational categories other than the near-Hudson during the fall period; for these categories, only 20% to 42% of the stations actually visited by mink were visited multiple times during

each monitoring period. The addition of observed mink (two monitoring visits) or the addition of mink tracks observed in snow or mud (two and 30 monitoring visits in the fall and spring periods, respectively) as records of mink visits did not substantially alter the relationships among frequency distributions for visits apparent when only track-plate data were considered as evidence of mink visitation in the data summary.

Mink visitation was also summarized to include the possibility of additional mink visits indicated by tracks that had been identified initially as tracks from long-tailed weasels. Eight additional records with tracks possibly from mink (5 and 3 records on track plates during the fall and spring periods, respectively) were included in a second set of data summaries. These track-plate records were at stations that did not otherwise have evidence of mink visitation as tracks on track plates identified as mink, as observed mink, or as mink tracks in mud or snow near scent stations. Summaries of frequencies for mink visits that included possible mink tracks identified initially as tracks from long-tailed weasels were not appreciably different from those that included only those tracks initially identified as mink.

Patterns of cumulative visitation with time for mink were similar between drainages within each distance category (far, near) during the fall. However, the pattern of cumulative visitation for near stations differed from that for far stations. Mink did not visit any near station for an extended period late in the fall period. In contrast to the fall, an extended period without mink visits to any station was limited to far-Hudson stations early in the spring period. The inclusion of observed mink and mink tracks near scent stations as records of visits did not appreciably alter the pattern of cumulative visitation except to increase the rate at far stations within the Hudson drainage during the spring period. The pattern of cumulative visitation that included possible mink tracks that had been identified initially as tracks from long-tailed weasels was not appreciably different from that that included only those tracks initially identified as mink.

Other species

As a group, mice, shrews and voles were the most frequent visitors to scent stations. Visits from squirrels as a group (three species: chipmunk, red and gray squirrels) were also high in frequency. Found at moderate frequencies, were visits from raccoons, opossums, feral cats, frogs, rabbits, salamanders, and, as a group, weasels other than mink (ermine, fishers, or tracks possibly from long-tailed weasels). The frequencies for mink were greater than those for other weasels. Visits from striped skunk and birds were at relatively low frequencies.

Frequency of visits and pattern of cumulative visitation for other weasels (ermine, fishers, or tracks possibly from long-tailed weasels) differed from those for mink. Although the percentage stations visited by ermine was similar among locational categories during both monitoring periods, the percentage of stations visited within comparable categories during spring was greater than that during the fall period. Possible long-tailed weasels and fisher visited scent stations relatively infrequently. The percentage of stations visited by long-tailed weasel did not vary markedly among locational categories during either monitoring period possibly due to a generally low visitation frequency. The pattern of cumulative visitation for long-tailed weasel was similar among categories during both monitoring periods with the exception of the near-Hudson, which lacked visits to any station during the spring. Fisher visited a lower percentage of stations within the Mohawk than Hudson drainage. Fisher never visited near-Mohawk stations and visited only 4 and 8% of the far-Mohawk stations in the fall and spring periods, respectively. In contrast, visits to stations within Hudson categories ranged from 6 to 36%. Also, for fisher, cumulative visitation for both near and far stations within the Hudson was at greater rate than that for comparable categories within the Mohawk drainage.

Each squirrel species (Eastern chipmunk, red and Eastern gray squirrels) visited a similar percentage of stations among locational categories within each monitoring period. Although percentages did not vary much seasonally for red and gray squirrels, the percentage of stations within each category visited by chipmunk was generally greater during the fall than spring period. The pattern of cumulative visitation for chipmunk was similar between drainages for both far-station and near-station categories during both monitoring periods. However, cumulative visitation was at a lower rate for near stations than far stations for both drainages late in the spring period. The pattern of cumulative visitation varied little among locational categories for red squirrel during either monitoring period except for a consistently lower rate for the near-Mohawk category. Similarly, the pattern of cumulative visitation varied little among categories for gray squirrel during either monitoring period.

Raccoon, feral cat, rabbit, and striped skunk visited a similar percentage of stations between drainages within each distance category (near, far) during both monitoring periods. In contrast to these medium-sized mammals, Virginia opossum visited a reduced percentage of stations for both near and far categories within the Hudson drainage during the fall period but visited a similar percentage between drainages within each distance category during the spring period. Striped skunk visited a lower percentage of stations within each locational category during both monitoring periods than did other medium-sized mammals. Raccoon, opossum, feral cat, rabbit, and striped skunk visited generally a

greater percentage of stations within each locational category during the fall than spring period. In contrast to medium-sized mammals, small mammals (as indicated by indistinguishable tracks of mice, shrews and voles) visited all stations multiple times during both monitoring periods.

The pattern of cumulative visitation varied little among locational categories for raccoon, rabbit or small mammals during either monitoring period or, for feral cat, during the fall. However, late in the spring period, rabbits generally had few visits within any locational category and feral cats had a reduced rate of cumulative visitation at both near and far stations within the Hudson as compared to the Mohawk. Cumulative visitation for striped skunk increased at only a low rate for near stations in either drainage late in the fall or the spring period; no or only a few far stations were visited in either drainage. For Virginia opossum, cumulative visitation for both near and far categories in the Hudson drainage was at lower rate than that for comparable categories in the Mohawk drainage during the fall period. However, during the spring period, the pattern of cumulative visitation for opossum varied little among locational categories.

Frogs and salamanders visited stations only during the fall period. Generally, for both frogs and salamanders, a similar percentage of stations were visited between drainages within each distance category (near, far). The pattern of cumulative visitation among locational categories varied little for salamanders; however, patterns of cumulative visitation for frogs were different between drainages. Frogs continued to visit stations until nominal week nine in the Hudson but did not visit stations after week five in the Mohawk drainage.

Birds visited a similar percentage of stations between drainages within each distance category (near, far) during both monitoring periods. The percentage of stations within each locational category visited by birds was low, but greater during the fall than spring. The pattern of cumulative visitation among locational categories varied little during both monitoring periods.

Effect of Missing Record

A high percentage of record was available within each locational category within the periods for which visitation frequencies were summarized. Although the percentage of record was lower for both distance categories (near, far) within the Hudson than Mohawk drainage, the difference in the percentage of record was consistent between distance categories during both monitoring periods. For species exhibiting marked variation in visitation, variation among locational categories was not consistent with the variation observed for lost record. A relative decrease in mink visitation was evident for the near-

station category but not the far station category in the Hudson in contrast with the consistently greater lost of record for both distance categories (near, far) within the Hudson as compared to the Mohawk during the fall period. Similarly, little difference in visitation for mink was evident between drainages for distance in contrast with the consistently greater loss of record in the Hudson during the spring period. Decreased visitation for fisher was evident for both distance categories within Mohawk drainage during both monitoring periods. This relationship contrasts with the consistently greater loss of record for distance categories within the Hudson drainage. Also, relationships among locational categories for record potentially compromised by flooding and/or snow cover are not related to visitation frequencies among locational categories. The greater percentage of record potentially compromised by flooding and/or snow cover lower for both distance categories (near, far) within the Hudson than Mohawk drainage, did not result in concomitant lower visitation within the Hudson for mink or fisher during the spring period. Consequently, loss of record is not a likely to account for the observed relationships among locational categories for visitation.

TABLES

Table 1. List of species and taxonomic groups expected to visit scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001.

Species or Species Group	ID Code
American mink (*Mustela vison*)	1
*Long-tailed weasel (*Mustela frenata*)	2
*American mink (*Mustela vison*)	2a
*Ermine (*Mustela erminea*)	2b
Ermine (*Mustela erminea*)	3
Fisher (*Martes pennanti*)	4
Raccoon (*Procyon lotor*)	5
Red fox (*Vulpes vulpes*), Gray fox (*Urocyon cinereoargenteus*)	6
Striped skunk (*Mephitis mephitis*)	7
Virginia opossum (*Didelphis virginiana*)	8
Muskrat (*Ondatra zibethicus*)	9
Squirrels	10
Feral cat (*Felis catus*)	11
Mice, Voles, Shrews	12
Frogs	13
Salamanders	14
Birds	15
Unidentifiable tracks	16
Cottontail rabbits (*Sylvilagus spp.*)	17
Red squirrel (*Tamiasciurus hudsonicus*)	18
Eastern chipmunk (*Tamias striatus*)	19
Eastern gray squirrel (*Sciurus carolinesis*)	20
Others	21

* Indicates long-tailed weasel (first ID code 2) additionally identified as either mink or ermine (second ID codes 2a and 2b, respectively).

Table 2. Percentages of the maximum potential monitoring visits for which record was obtained at scent stations in locational categories within the Hudson and Mohawk drainages from September 2000 to April 2001.

			Monitoring Visits having					
			One or more one enclosures with record		Two enclosures with record		Snow/flooding	
Location	Stations[1]	Station-weeks[2]	Number	Percentage[3]	Number	Percentage[3]	Number[4]	Percentage[5]
Fall (11-week period, nominal weeks 1 to 11; 10/03/00 to 12/12/00)								
Far Hudson	16	176	149	85%	139	79%	14	9%
Far Mohawk	23	253	238	94%	238	94%	6	3%
Near Hudson	13	143	129	90%	119	83%	5	4%
Near Mohawk	17	187	187	100%	186	99%	3	2%
Spring (12-week period, nominal weeks 15 to 26; 1/9/01 to 3/27/01)								
Far Hudson	17	204	196	96%	174	85%	37	19%
Far Mohawk	25	300	293	98%	282	94%	25	9%
Near Hudson	14	168	157	93%	147	88%	28	18%
Near Mohawk	17	204	204	100%	191	94%	11	5%

[1] Total number of scent stations within each locational category. [2] Station-weeks equal the maximum potential monitoring visits determined from the product of the total number of stations within each locational category and number of weeks within each seasonal period. [3] Percentage based on station-weeks. [4] Number of stations that had the potential for the recording of tracks on one or more track plates compromised at some point by snow cover or flooding during the weekly period. [5] Percentage based on monitoring visits having one or more enclosures with record.

Table 3. Total visits by species and taxonomic groups to track-plate enclosures for locational categories within the Hudson and Mohawk River drainages from September 2000 to April 2001.

Species or Group	Far Hudson	Far Mohawk	Near Hudson	Near Mohawk	Total Visits
American mink	30	49	16	28	123
*Long-tailed weasel	5	6	1	13	25
*American mink	2	3	0	8	13
*Ermine	3	3	1	5	12
Ermine	22	14	8	17	61
Fisher	8	10	18	1	37
Raccoon	42	76	35	64	217
Red fox, Gray fox	0	0	0	0	0
Striped skunk	2	9	10	7	28
Virginia opossum	21	43	22	64	150
Muskrat	0	0	0	0	0
Squirrels	181	367	150	150	848
Feral cat	28	75	27	60	190
Mice, Voles, Shrews	418	819	348	672	2257
Frogs	18	34	28	37	117
Salamanders	21	49	19	29	118
Birds	2	12	4	5	23
Unidentifiable	1	0	0	0	1
Cottontail rabbits	11	34	20	49	114
Red squirrel	63	85	36	19	203
Eastern chipmunk	77	158	51	84	370
Eastern gray squirrel	35	116	30	45	226
Others	0	4	2	1	7

* Indicates long-tailed weasel visits (species code 2) additionally identified as either mink or ermine visits (species codes 2a and 2b, respectively).

Table 4. Number of visits recorded on paper or only on soot by species and taxonomic groups for track-plate enclosures within the Hudson and Mohawk River drainages from September 2000 to April 2001.

Species or Group	On paper	Only on soot	Total Visits
American mink	90	33	123
*Long-tailed weasel	21	4	25
*American mink	9	4	13
*Ermine	12	0	12
Ermine	58	3	61
Fisher	32	5	37
Raccoon	158	59	217
Red fox, Gray fox	0	0	0
Striped skunk	24	4	28
Virginia opossum	121	29	150
Muskrat	0	0	0
Squirrels	732	116	848
Feral cat	172	18	190
Mice, Voles, Shrews	2130	127	2257
Frogs	115	2	117
Salamanders	118	0	118
Birds	23	0	23
Unidentifiable	1	0	1
Cottontail rabbits	105	9	114
Red squirrel	203	0	203
Eastern chipmunk	370	0	370
Eastern gray squirrel	226	0	226
Others	3	4	7

* Indicates long-tailed weasel visits (species code 2) additionally identified as either mink or ermine visits (species codes 2a and 2b, respectively).

Table 5. Frequencies of track measurements on shelving paper for each species by foot.

Foot	Number of tracks measured	Track Measures								
		A	B	C	D	E	F	G	H	I
American mink, *Mustela vison* (114 tracks identified)										
Front	57	49	56	45	27	3	4	50	53	27
Hind	29	26	28	23	13	2	2	24	24	14
Probable Front	12	8	11	7	5	0	0	9	9	6
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	16	12	16	10	8	0	1	11	15	5
Total	114	95	111	85	53	5	7	94	101	52
*Long-tailed weasel, *Mustela frenata* (33 tracks identified)										
Front	10	9	10	6	5	2	1	8	9	4
Hind	8	6	8	5	4	1	2	6	6	6
Probable Front	7	2	7	1	1	1	0	3	4	2
Probable Hind	4	2	4	1	0	0	1	1	1	1
Foot Uncertain	4	2	4	0	0	0	2	1	3	1
Total	33	21	33	13	10	4	6	19	23	14
*American mink, *Mustela vison* (15 tracks identified)										
Front	5	5	5	2	2	1	0	5	5	2
Hind	4	3	4	3	3	1	2	3	3	3
Probable Front	3	1	3	1	0	1	0	2	2	1
Probable Hind	2	1	2	1	0	0	0	1	0	1
Foot Uncertain	1	1	1	0	0	0	0	0	1	0
Total	15	11	15	7	5	3	2	11	12	7

Table 5. Continued

Foot	Number of tracks measured	Track Measures								
		A	B	C	D	E	F	G	H	I
		*Ermine, *Mustela erminea* (18 tracks identified)								
Front	5	4	5	4	3	1	1	3	4	2
Hind	4	3	4	2	1	0	0	3	3	3
Probable Front	4	1	4	0	1	0	0	1	2	1
Probable Hind	2	1	2	0	0	0	1	0	0	0
Foot Uncertain	3	1	3	0	0	0	2	1	2	1
Total	18	10	18	6	5	1	4	8	11	7
		Ermine, *Mustela erminea* (73 tracks identified)								
Front	19	10	18	7	3	0	1	13	14	7
Hind	20	6	19	4	2	1	4	4	5	3
Probable Front	13	4	13	2	0	2	2	3	4	4
Probable Hind	1	0	1	0	0	0	0	0	0	0
Foot Uncertain	20	11	20	6	4	2	2	8	12	10
Total	73	31	71	19	9	5	9	28	35	24
		Fisher, *Martes pennanti* (38 tracks identified)								
Front	12	10	12	11	10	5	7	11	12	6
Hind	9	7	9	7	6	0	4	7	7	5
Probable Front	7	4	7	6	5	0	0	7	7	3
Probable Hind	1	1	1	1	0	0	0	1	1	0
Foot Uncertain	9	5	6	6	3	0	0	3	6	0
Total	38	27	35	31	24	5	11	29	33	14

Table 5. Continued

Foot	Number of tracks measured	Track Measures								
		A	B	C	D	E	F	G	H	I
Raccoon, *Procyon lotor* (148 tracks identified)										
Front	96	91	0	89	88	40	0	0	92	93
Hind	52	0	0	0	0	44	0	0	48	50
Probable Front	0	0	0	0	0	0	0	0	0	0
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	0	0	0	0	0	0	0	0	0	0
Total	148	91	0	89	88	84	0	0	140	143
Striped skunk, *Mephitis mephitis* (36 tracks identified)										
Front	21	21	0	20	20	5	0	0	21	21
Hind	15	0	0	0	0	14	0	0	13	15
Probable Front	0	0	0	0	0	0	0	0	0	0
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	0	0	0	0	0	0	0	0	0	0
Total	36	21	0	20	20	19	0	0	34	36
Virginia opossum, *Didelphis virginiana* (161 tracks identified)										
Front	99	97	0	97	98	49	0	0	99	97
Hind	62	57	0	58	58	56	0	0	58	61
Probable Front	0	0	0	0	0	0	0	0	0	0
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	0	0	0	0	0	0	0	0	0	0
Total	161	154	0	155	156	105	0	0	157	158

Table 5. Continued

Foot	Number of tracks measured	Track Measures								
		A	B	C	D	E	F	G	H	I
Feral cat, *Felis catus* (127 tracks identified)										
Foot Indeterminate	127	125	0	123	117	0	0	0	124	125
Total	127	125	0	123	117	0	0	0	124	125
Cottontail rabbits, *Sylvilagus spp.* (80 tracks identified)										
Front	47	0	0	0	0	4	39	0	0	47
Hind	29	0	0	0	0	0	26	0	0	28
Probable Front	0	0	0	0	0	0	0	0	0	0
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	4	0	0	0	0	0	4	0	0	4
Total	80	0	0	0	0	4	69	0	0	79
Red squirrel, *Tamiasciurus hudsonicus* (318 tracks identified)										
Front	174	169	0	166	160	104	0	168	170	174
Hind	144	142	0	139	135	0	7	0	140	132
Probable Front	0	0	0	0	0	0	0	0	0	0
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	0	0	0	0	0	0	0	0	0	0
Total	318	311	0	305	295	104	7	168	310	306

Table 5. Continued

Foot	Number of tracks measured	Track Measures								
		A	B	C	D	E	F	G	H	I
Eastern chipmunk, *Tamias striatus* (577 tracks identified)										
Front	319	294	0	269	264	175	0	269	273	315
Hind	258	253	0	235	232	0	3	0	237	220
Probable Front	0	0	0	0	0	0	0	0	0	0
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	0	0	0	0	0	0	0	0	0	0
Total	577	547	0	504	496	175	3	269	510	535
Eastern gray squirrel, *Sciurus carolinesis* (342 tracks identified)										
Front	187	183	0	179	175	121	0	170	180	183
Hind	155	152	0	151	147	16	20	0	149	142
Probable Front	0	0	0	0	0	0	0	0	0	0
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	0	0	0	0	0	0	0	0	0	0
Total	342	335	0	330	322	137	20	170	329	325
Total (2047 tracks identified)										
Front	1041	933	97	889	850	508	52	689	923	974
Hind	781	649	64	622	597	134	68	41	687	676
Probable Front	39	18	38	16	11	3	2	22	24	15
Probable Hind	6	3	6	2	0	0	1	2	2	1
Foot Uncertain/ Indeterminate	180	155	46	145	132	2	9	23	160	145
Total	2047	1758	251	1674	1590	647	132	777	1796	1811

* Indicates long-tailed weasel tracks (first ID code 2) additionally identified as either mink or ermine tracks (second ID codes 2a and 2b, respectively).

Table 6. Frequencies of track measurements on sooted track board for each species by foot.

Foot	Number of tracks measured	Track Measures								
		A	B	C	D	E	F	G	H	I
American mink, *Mustela vison* (31 tracks identified)										
Front	13	10	11	6	7	0	0	12	13	4
Hind	0	0	0	0	0	0	0	0	0	0
Probable Front	0	0	0	0	0	0	0	0	0	0
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	14	5	11	4	4	0	0	5	8	4
Total	†27	15	22	10	11	0	0	17	21	8
*Long-tailed weasel, *Mustela frenata* (6 tracks identified)										
Front	5	4	4	1	2	0	0	3	3	1
Hind	0	0	0	0	0	0	0	0	0	0
Probable Front	0	0	0	0	0	0	0	0	0	0
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	1	0	1	0	0	0	0	1	1	0
Total	6	4	5	1	2	0	0	4	4	1
*American mink, *Mustela vison* (6 tracks identified)										
Front	5	4	4	1	2	0	0	3	3	1
Hind	0	0	0	0	0	0	0	0	0	0
Probable Front	0	0	0	0	0	0	0	0	0	0
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	1	0	1	0	0	0	0	1	1	0
Total	6	4	5	1	2	0	0	4	4	1

Table 6. Continued

Foot	Number of tracks measured	Track Measures								
		A	B	C	D	E	F	G	H	I
		Ermine, *Mustela erminea* (1 track identified)								
Front	0	0	0	0	0	0	0	0	0	0
Hind	0	0	0	0	0	0	0	0	0	0
Probable Front	0	0	0	0	0	0	0	0	0	0
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	0	0	0	0	0	0	0	0	0	0
Total	‡0	0	0	0	0	0	0	0	0	0
		Fisher, *Martes pennanti* (3 tracks identified)								
Front	1	1	1	1	1	0	0	0	1	1
Hind	0	0	0	0	0	0	0	0	0	0
Probable Front	0	0	0	0	0	0	0	0	0	0
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	2	0	2	0	0	0	1	0	1	2
Total	3	1	3	1	1	0	1	0	2	3
		Eastern gray squirrel, *Sciurus carolinesis* (1 track identified)								
Front	1	0	0	0	0	1	0	0	1	1
Hind	0	0	0	0	0	0	0	0	0	0
Probable Front	0	0	0	0	0	0	0	0	0	0
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	0	0	0	0	0	0	0	0	0	0
Total	1	0	0	0	0	1	0	0	1	1

Table 6. Continued

Foot	Number of tracks measured	Track Measures								
		A	B	C	D	E	F	G	H	I
		Total (42 tracks identified)								
Front	20	15	16	8	10	1	0	15	18	7
Hind	0	0	0	0	0	0	0	0	0	0
Probable Front	0	0	0	0	0	0	0	0	0	0
Probable Hind	0	0	0	0	0	0	0	0	0	0
Foot Uncertain	17	5	14	4	4	0	1	6	10	6
Total	†37	20	30	12	14	1	1	21	28	13

* Indicates long-tailed weasel tracks (first ID code 2) additionally identified as either mink or ermine tracks (second ID codes 2a and 2b, respectively).

† Four mink tracks were not measurable.

‡ One ermine track was not measurable.

Table7. Frequencies for the identification of measured tracks of front and hind feet of mink, long-tailed weasels, ermine and fisher. Tracks were recorded on shelving paper portion of track plates at scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001.

Foot	Mink		Long-tailed Weasel		Ermine		Fisher	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Front	57	50	10	31	19	26	12	31
Hind	29	25	8	24	20	28	9	24
Probable Front	12	11	7	21	13	18	7	18
Probable Hind	0	0	4	12	1	1	1	3
Unidentified	16	14	4	12	20	27	9	24

Table 8. Statistical summary for measurement parameters of mink tracks recorded on shelving paper portion of track plates at scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001. Summary includes only tracks initially identified as mink (code 1) and positively identified as to foot origin (code F or H). Measurements were from 57 and 29 front- and hind-foot tracks, respectively.

Measurement	Front Foot					Hind Foot				
	N[1]	Mean	Std[2]	Min[3]	Max[4]	N	Mean	Std	Min	Max
A	49	21.2	3.3	15.0	28.0	26	21.1	4.0	13.8	28.2
B	56	20.5	3.8	13.8	29.0	28	17.7	3.9	11.7	27.0
C	45	7.7	1.9	4.4	12.7	23	7.2	2.3	3.7	12.2
D	27	9.8	2.3	6.2	14.5	13	9.2	2.6	5.2	13.3
E	3	32.7	9.2	22.5	40.2	2	31.8	3.1	29.6	34.0
F	4	34.0	10.5	26.7	49.6	2	39.2	9.7	32.3	46.0
G	50	5.1	1.2	2.3	7.2	24	4.4	1.1	2.7	6.9
H	53	9.9	1.9	7.2	15.1	24	10.9	2.0	6.3	14.7
I	27	20.9	4.6	14.1	30.4	14	19.1	4.9	11.7	25.4

[1]N = Sample Size, [2]Std = Standard Deviation, [3]Min = Minimum, [4]Max = Maximum

Table 9. Statistical summary for measurement parameters of long-tailed weasel tracks recorded on shelving paper portion of track plates at scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001. Summary includes only tracks initially identified as long-tailed weasel (first code 2) and positively identified as to foot origin (code F or H). Measurements were from 10 and 8 front- and hind-foot tracks, respectively. Nine tracks each were subsequently identified as mink (second code 2a) or ermine (second code 2b).

Measurement	Front Foot					Hind Foot				
	N[1]	Mean	Std[2]	Min[3]	Max[4]	N	Mean	Std	Min	Max
A	9	12.5	2.0	10.0	16.3	6	13.5	2.3	10.3	16.3
B	10	12.9	2.4	8.8	16.9	8	11.5	2.7	7.3	16.8
C	6	4.7	1.4	3.0	6.4	5	3.9	1.5	1.5	5.4
D	5	6.7	1.9	3.7	8.9	4	5.8	3.3	1.4	9.2
E	2	16.2	1.2	15.3	17.0	1	7.0		7.0	7.0
F	1	24.9		24.9	24.9	2	24.4	4.6	21.1	27.6
G	8	3.2	0.8	2.1	4.5	6	2.8	1.3	1.0	4.1
H	9	6.3	1.3	4.2	8.1	6	7.7	1.5	5.4	9.4
I	4	13.2	4.0	9.3	17.6	6	12.7	4.5	7.4	20.6

[1]N = Sample Size, [2]Std = Standard Deviation, [3]Min = Minimum, [4]Max = Maximum

Table 10. Statistical summary for measurement parameters of ermine tracks recorded on shelving paper portion of track plates at scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001. Summary includes only tracks initially identified as ermine (code 3) and positively identified as to foot origin (code F or H). Measurements were from 19 and 20 front- and hind-foot tracks, respectively.

Measurement	Front Foot					Hind Foot				
	N[1]	Mean	Std[2]	Min[3]	Max[4]	N	Mean	Std	Min	Max
A	10	12.8	2.0	9.9	15.9	6	11.7	3.3	6.8	16.1
B	18	12.3	1.7	9.1	14.8	19	9.9	2.0	6.4	14.1
C	7	4.4	0.9	3.5	6.2	4	3.8	0.4	3.3	4.2
D	3	5.6	0.5	5.1	6.0	2	6.0	0.2	5.8	6.1
E	0					1	10.6		10.6	10.6
F	1	27.8		27.8	27.8	4	21.8	4.9	17.0	27.7
G	13	2.3	0.6	1.6	3.5	4	2.4	0.4	2.0	2.8
H	14	6.4	1.3	4.1	8.2	5	6.7	2.1	3.4	9.1
I	7	13.9	2.0	11.3	17.4	3	13.0	0.6	12.5	13.7

[1]N = Sample Size, [2]Std = Standard Deviation, [3]Min = Minimum, [4]Max = Maximum

Table 11. Statistical summary for measurement parameters of fisher tracks recorded on shelving paper portion of track plates at scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001. Summary includes only tracks and positively identified as to foot origin (F or H code). Measurements were from 12 and 9 front- and hind-foot tracks, respectively.

Measurement	Front Foot					Hind Foot				
	N[1]	Mean	Std[2]	Min[3]	Max[4]	N	Mean	Std	Min	Max
A	10	43.6	3.3	40.2	49.9	7	46.6	3.8	40.6	50.3
B	12	35.9	5.7	27.8	48.7	9	37.2	8.0	30.0	54.6
C	11	16.3	3.0	12.5	21.6	7	15.9	2.8	12.1	20.8
D	10	23.6	5.1	14.2	32.3	6	27.3	5.1	21.5	35.3
E	5	61.5	9.4	52.3	76.4	0				
F	7	84.3	8.3	71.4	94.5	4	80.3	14.2	64.5	99.1
G	11	21.1	3.3	5.9	17.1	7	13.4	4.5	5.2	19.2
H	12	19.5	2.5	16.5	25.1	7	19.6	1.8	16.9	21.7
I	6	43.9	7.1	34.3	51.8	5	49.9	7.9	40.1	59.3

[1]N = Sample Size, [2]Std = Standard Deviation, [3]Min = Minimum, [4]Max = Maximum

Table 12. Statistical summary for measurement parameters of raccoon tracks recorded on shelving paper portion of track plates at scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001. Measurements were from 96 and 52 front- and hind-foot tracks, respectively.

Measurement	Front Foot					Hind Foot				
	N[1]	Mean	Std[2]	Min[3]	Max[4]	N	Mean	Std	Min	Max
A	91	43.7	3.3	33.9	50.0	NA[5]				
C	89	22.5	3.0	13.0	29.3	NA				
D	88	26.7	3.2	17.5	32.9	NA				
E	40	58.7	5.7	42.4	70.2	44	72.3	9.6	47.8	89.8
H	92	8.9	3.2	2.3	17.3	48	8.1	3.1	2.3	14.0
I	93	37.5	4.7	27.0	50.9	50	37.0	4.4	30.4	50.0

[1]N = Sample Size, [2]Std = Standard Deviation, [3]Min = Minimum, [4]Max = Maximum

[5]NA = Not included as a standard measurement

Table 13. Statistical summary for measurement parameters of striped skunk tracks recorded on shelving paper portion of track plates at scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001. Measurements were from 21 and 15 front- and hind-foot tracks, respectively.

Measurement	Front Foot					Hind Foot				
	N[1]	Mean	Std[2]	Min[3]	Max[4]	N	Mean	Std	Min	Max
A	21	22.5	2.0	19.4	27.0	NA[5]				
C	20	11.0	1.9	7.6	15.1	NA				
D	20	15.9	2.1	13.2	19.7	NA				
E	5	34.0	2.1	31.2	36.5	14	35.3	3.3	28.6	40.7
H	21	6.3	1.6	3.2	9.1	13	4.7	1.6	1.4	7.5
I	21	23.1	2.4	19.8	29.0	15	22.4	2.2	15.5	25.1

[1]N = Sample Size, [2]Std = Standard Deviation, [3]Min = Minimum, [4]Max = Maximum

[5]NA = Not included as a standard measurement

Table 14. Statistical summary for measurement parameters of Virginia opossum tracks recorded on shelving paper portion of track plates at scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001. Measurements were from 99and 62 front- and hind-foot tracks, respectively.

Measurement	Front Foot					Hind Foot				
	N[1]	Mean	Std[2]	Min[3]	Max[4]	N	Mean	Std	Min	Max
A	97	33.7	4.6	21.3	46.6	57	35.0	5.9	21.0	48.7
C	97	17.9	3.3	10.9	29.7	58	21.2	4.6	11.6	34.1
D	98	23.9	3.6	14.5	32.8	58	26.9	5.7	16.1	38.0
E	49	40.2	4.2	30.6	49.0	56	43.4	5.3	30.2	53.9
H	99	11.3	1.9	6.5	16.6	58	12.4	1.8	8.5	17.7
I	97	46.8	5.6	31.1	59.7	61	54.5	6.2	41.4	64.8

[1]N = Sample Size, [2]Std = Standard Deviation, [3]Min = Minimum, [4]Max = Maximum

Table 15. Statistical summary for measurement parameters of feral cat tracks recorded on shelving paper portion of track plates at scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001. Measurements were from 127 tracks.

Measurement	N[1]	Mean	Std[2]	Min[3]	Max[4]
A	125	26.7	2.9	16.9	33.4
C	123	11.4	1.6	7.8	15.6
D	117	16.6	2.1	6.5	21.1
H	124	7.4	2.3	3.0	15.3
I	125	27.2	2.7	21.0	35.5

[1]N = Sample Size, [2]Std = Standard Deviation, [3]Min = Minimum, [4]Max = Maximum

Table 16. Statistical summary for measurement parameters of cottontail rabbit tracks recorded on shelving paper portion of track plates at scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001. Summary includes only tracks positively identified as to foot origin (F or H code). Measurements were from 47 and 29 front- and hind-foot tracks, respectively.

Measurement	Front Foot					Hind Foot				
	N[1]	Mean	Std[2]	Min[3]	Max[4]	N	Mean	Std	Min	Max
F	39	35.0	5.6	15.4	45.5	26	67.8	13.4	43.4	93.7
I	47	19.6	3.1	12.4	25.2	28	21.3	2.6	15.5	26.7

[1]N = Sample Size, [2]Std = Standard Deviation, [3]Min = Minimum, [4]Max = Maximum

Table 17. Statistical summary for measurement parameters of red squirrel tracks recorded on shelving paper portion of track plates at scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001. Measurements were from 174 and 144 front- and hind-foot tracks, respectively.

Measurement	Front Foot					Hind Foot				
	N[1]	Mean	Std[2]	Min[3]	Max[4]	N	Mean	Std	Min	Max
A	169	17.3	2.2	10.5	21.2	142	17.9	1.7	12.1	22.9
C	166	6.1	0.8	3.5	8.2	139	6.4	0.9	3.7	10.8
D	160	7.9	0.8	5.3	9.9	135	9.9	1.1	6.3	13.5
E	104	23.7	2.2	15.4	27.1	0				
F	NA[5]					7	35.6	6.2	30.0	46.5
G	168	3.5	0.6	2.0	5.0	NA				
H	170	8.8	1.4	3.8	12.2	140	9.0	1.0	6.4	11.9
I	174	16.9	2.3	11.6	23.0	132	19.1	2.4	13.9	25.3

[1]N = Sample Size, [2]Std = Standard Deviation, [3]Min = Minimum, [4]Max = Maximum

[5]NA = Not included as a standard measurement

Table 18. Statistical summary for measurement parameters of Eastern chipmunk tracks recorded on shelving paper portion of track plates at scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001. Measurements were from 319 and 258 front- and hind-foot tracks, respectively.

Measurement	Front Foot					Hind Foot				
	N[1]	Mean	Std[2]	Min[3]	Max[4]	N	Mean	Std	Min	Max
A	294	11.7	1.0	9.0	16.8	253	13.4	1.0	10.0	16.7
C	269	4.7	0.5	3.3	6.7	235	5.2	0.6	3.1	7.3
D	264	5.9	0.6	4.5	8.1	232	7.3	0.8	5.0	9.8
E	175	15.9	1.2	11.4	21.3	0				
F	NA[5]					3	26.7	0.9	26.1	27.7
G	269	3.0	0.5	1.3	4.7	NA				
H	273	5.6	0.8	3.4	8.3	237	6.6	0.8	4.7	10.0
I	315	13.3	1.5	9.2	18.5	220	14.3	2.1	8.8	20.2

[1]N = Sample Size, [2]Std = Standard Deviation, [3]Min = Minimum, [4]Max = Maximum

[5]NA = Not included as a standard measurement

Table 19. Statistical summary for measurement parameters of Eastern gray squirrel tracks recorded on shelving paper portion of track plates at scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001 Measurements were from 187 and 155 front- and hind-foot tracks, respectively.

Measurement	Front Foot					Hind Foot				
	N[1]	Mean	Std[2]	Min[3]	Max[4]	N	Mean	Std	Min	Max
A	183	23.8	2.4	18.1	30.1	152	26.2	2.3	19.6	31.9
C	179	8.8	1.2	5.7	12.0	151	10.4	1.5	6.5	14.7
D	175	11.2	1.0	7.9	15.9	147	14.4	1.3	10.6	17.3
E	121	32.8	3.2	23.5	39.6	16	39.9	3.3	33.7	46.4
F	NA[5]					20	45.9	5.5	37.0	54.0
G	170	5.3	0.9	3.2	8.0	NA				
H	180	11.7	1.6	6.2	16.0	149	12.4	1.4	9.3	15.7
I	183	21.7	2.7	14.8	30.5	142	25.1	3.6	17.0	37.5

[1]N = Sample Size, [2]Std = Standard Deviation, [3]Min = Minimum, [4]Max = Maximum

[5]NA = Not included as a standard measurement

Table 20. Frequency of weasel tracks (mink, long-tailed weasel, ermine, and fisher) with specific combinations of measurements. Tracks positively identified as to foot origin (codes F and H).

Measurements	Frequency	Percentage
(B)**ACGH**	24	14.6
(BH)**ACG**	1	0.6
(BG)**ACH**	1	0.6
(BGH)**AC**	10	6.1
(BC)**AGH**	1	0.6
(BCG)**AH**	1	0.6
(BCGH)**A**	3	1.8
(ACGH)**B**	4	2.4
(AB)**CGH**	4	2.4
(ABH)**CG**	4	2.4
(ABGH)**C**	12	7.3
(ABC)**GH**	2	1.2
(ABCH)**G**	5	3.1
(ABCG)**H**	1	0.6
(ABCGH)	91	55.5

Missing measurements are indicated in bold; available measurements are in parentheses.

Table 21. Frequency of weasel tracks (mink, long-tailed weasel, ermine, and fisher) with specific combinations of measurements. For all measured tracks.

Measurements	Frequency	Percentage
(CH)**ABG**	2	0.8
(B)**ACGH**	49	19.0
(BH)**ACG**	6	2.3
(BG)**ACH**	1	0.4
(BGH)**AC**	17	6.6
(BC)**AGH**	1	0.4
(BCG)**AH**	1	0.4
(BCGH)**A**	7	2.7
(A)**BCGH**	1	0.4
(ACGH)**B**	5	1.9
(AB)**CGH**	8	3.1
(ABH)**CG**	9	3.5
(ABGH)**C**	19	7.4
(ABC)**GH**	4	1.6
(ABCH)**G**	8	3.1
(ABCG)**H**	1	0.4
(ABCGH)	119	46.1

Missing measurements are indicated in bold; available measurements are in parentheses.

Table 22. Frequency of squirrel tracks with specific combinations of measurements.

Measurements	Frequency	Percentage
(I)**ACDH**	27	2.2
(HI)**ACD**	13	1.1
(CDHI)**A**	4	0.3
(AI)**CDH**	51	4.1
(AHI)**CD**	6	0.5
(ADHI)**C**	1	0.1
(ACI)**DH**	1	0.1
(ACH)**DI**	4	0.3
(ACHI)**D**	22	1.8
(ACD)**HI**	5	0.4
(ACDI)**H**	4	0.3
(ACDH)**I**	62	5.0
(ACDHI)	1037	83.8

Missing measurements are indicated in bold; available measurements are in parentheses

Table 23. Number of tracks identified by species and classified by discriminant analysis (k-nearest-neighbor, k=1, proportional) into four statistical categories for squirrels. Tracks without estimated measurements included in both training and test data.

	Training [a]						Test					
From Species	Into Statistical Categories for Squirrels				Total	Error	Into Statistical Categories for Squirrels				Total	Error
	Gray	Red	Chipmunk	Other			Gray	Red	Chipmunk	Other		
Gray Squirrel	146	0	0	0	146	0.000	147	8	0	0	155	0.052
Red Squirrel	0	135	0	0	135	0.000	9	124	14	0	147	0.157
Chipmunk	0	0	219	0	219	0.000	0	8	227	0	235	0.034
Total	146	135	219	0	500	0.000	156	140	241	0	537	0.072

[a] Tracks with no estimated measurements; tracks randomly assigned to sample groups for training (calibration) and test (validation) datasets .

Table 24. Number of tracks identified by species and classified by discriminant analysis (k-nearest-neighbor, k=1, proportional) into five statistical categories for weasels. Tracks without estimated measurements included in both training and test data.

	Training [a]							Test						
From Species	Into Statistical Categories for Weasels					Total	Error	Into Statistical Categories for Weasels					Total	Error
	Ermine	LTW [b]	Mink	Fisher	Other			Ermine	LTW	Mink	Fisher	Other		
Ermine	5	0	0	0	0	5	0.000	2	0	0	0	0	2	0.000
Long-tailed weasel	0	5	0	0	0	5	0.000	0	2	3	0	0	5	0.600
Mink	0	0	27	0	0	27	0.000	3	2	27	0	0	32	0.156
Fisher	0	0	0	6	0	6	0.000	0	0	0	9	0	9	0.000
Total	5	5	27	6	0	43	0.000	5	4	30	9	0	48	0.168

[a] Tracks with no estimated measurements; tracks randomly assigned to sample groups for training (calibration) and test (validation) datasets .

[b] LTW = Long-tailed weasel

Table 25. Number of tracks identified by species and classified by discriminant analysis (k-nearest-neighbor, k=1, proportional) into four statistical categories for weasels. Tracks without estimated measurements included in both training and test data.

	Training [a]						Test					
From Species	Into Statistical Categories for Weasels				Total	Error	Into Statistical Categories for Weasels				Total	Error
	Ermine	Mink	Fisher	Other			Ermine	Mink	Fisher	Other		
Ermine	6	0	0	0	6	0.000	5	1	0	0	6	0.167
Mink	0	29	0	0	29	0.000	1	34	0	0	35	0.029
Fisher	0	0	8	0	8	0.000	0	0	7	0	7	0.000
Total	6	29	8	0	43	0.000	6	35	7	0	48	0.043

[a] Tracks with no estimated measurements; tracks randomly assigned to sample groups for training (calibration) and test (validation) datasets .

Table 26. Number of tracks identified by species and classified by discriminant analysis (k-nearest-neighbor, k=1, proportional) into four statistical categories for squirrels. Tracks without estimated and with estimated measurements included in both training and test data.

	Training [a]						Test					
From Species	Into Statistical Categories for Squirrels				Total	Error	Into Statistical Categories for Squirrels				Total	Error
	Gray	Red	Chipmunk	Other			Gray	Red	Chipmunk	Other		
Gray Squirrel	163	0	0	0	163	0.000	172	7	0	0	179	0.039
Red Squirrel	0	134	0	0	134	0.000	10	134	23	0	167	0.198
Chipmunk	0	0	277	0	277	0.000	0	14	286	0	300	0.047
Total	163	134	277	0	591	0.000	182	155	309	0	646	0.083

[a] Tracks with estimated measurements included; tracks randomly assigned to sample groups for training (calibration) and test (validation) datasets.

Table 27. Number of tracks identified by species and classified by discriminant analysis (k-nearest-neighbor, k=1, proportional) into five statistical categories for weasels. Tracks without estimated and with estimated measurements included in both training and test data.

	Training [a]							Test						
From Species	Into Statistical Categories for Weasels					Total	Error	Into Statistical Categories for Weasels					Total	Error
	Ermine	LTW [b]	Mink	Fisher	Other			Ermine	LTW	Mink	Fisher	Other		
Ermine	22	0	0	0	0	22	0.000	13	3	1	0	0	17	0.235
Long-tailed weasel	0	10	0	0	0	10	0.000	1	4	3	0	0	8	0.500
Mink	0	0	41	0	0	41	0.000	1	5	39	0	0	45	0.133
Fisher	0	0	0	11	0	11	0.000	0	0	0	10	0	10	0.000
Total	22	10	41	11	0	84	0.000	15	12	43	10	0	80	0.186

[a] Tracks with estimated measurements included; tracks randomly assigned to sample groups for training (calibration) and test (validation) datasets.

[b] LTW = Long-tailed weasel

Table 28. Number of tracks identified by species and classified by discriminant analysis (k-nearest-neighbor, k=1, proportional) into four statistical categories for weasels. Tracks without estimated and with estimated measurements included in both training and test data.

	Training [a]						Test					
From Species	Into Statistical Categories for Weasels				Total	Error	Into Statistical Categories for Weasels				Total	Error
	Ermine	Mink	Fisher	Other			Ermine	Mink	Fisher	Other		
Ermine	28	0	0	0	28	0.000	18	2	0	0	20	0.100
Mink	0	45	0	0	45	0.000	2	48	0	0	50	0.040
Fisher	0	0	11	0	11	0.000	0	0	10	0	10	0.000
Total	28	45	11	0	84	0.000	20	50	10	0	80	0.055

[a] Tracks with estimated measurements included; tracks randomly assigned to sample groups for training (calibration) and test (validation) datasets.

Table 29. Number of tracks identified by species and classified by discriminant analysis (k-nearest-neighbor, k=1, proportional) into four statistical categories for squirrels. Tracks without estimated and with estimated measurements used for training and test data, respectively.

	Training [a]						Test [b]					
From Species	Into Statistical Categories for Squirrels				Total	Error	Into Statistical Categories for Squirrels				Total	Error
	Gray	Red	Chipmunk	Other			Gray	Red	Chipmunk	Other		
Random sample of tracks selected for training dataset [a]												
Gray Squirrel	145	0	0	0	145	0.000	39	2	0	0	41	0.049
Red Squirrel	0	135	0	0	135	0.000	3	25	8	0	36	0.306
Chipmunk	0	0	220	0	220	0.000	0	7	116	0	123	0.057
Total	145	135	220	0	500	0.000	42	34	124	0	200	0.129
All tracks included in training dataset [b]												
Gray Squirrel	301	0	0	0	301	0.000	39	2	0	0	41	0.049
Red Squirrel	0	282	0	0	282	0.000	3	26	7	0	36	0.279
Chipmunk	0	0	454	0	454	0.000	0	5	118	0	123	0.041
Total	301	282	454	0	1037	0.000	42	33	125	0	200	0.133

[a] Tracks without estimated measurements used for training (calibration) dataset.

[b] Tracks with estimated measurements used for test (validation) dataset.

Table 30. Number of tracks identified by species and classified by discriminant analysis (k-nearest-neighbor, k=1, proportional) into five statistical categories for weasels. Tracks without estimated and with estimated measurements used for training and test data, respectively.

	Training [a]							Test [b]						
From Species	Into Statistical Categories for Weasels					Total	Error	Into Statistical Categories for Weasels					Total	Error
	Ermine	LTW [c]	Mink	Fisher	Other			Ermine	LTW	Mink	Fisher	Other		
Random sample of tracks selected for training dataset [a]														
Ermine	4	0	0	0	0	4	0.000	9	19	4	0	0	32	0.719
Long-tailed weasel	0	3	0	0	0	3	0.000	3	1	4	0	0	8	0.875
Mink	0	0	28	0	0	28	0.000	0	1	26	0	0	27	0.037
Fisher	0	0	0	8	0	8	0.000	0	0	1	5	0	6	0.167
Total	4	3	28	8	0	43	0.000	12	21	35	5	0	73	0.183
All tracks included in training dataset [a]														
Ermine	7	0	0	0	0	7	0.000	25	7	0	0	0	32	0.219
Long-tailed weasel	0	10	0	0	0	10	0.000	4	3	1	0	0	8	0.625
Mink	0	0	59	0	0	59	0.000	0	3	24	0	0	27	0.111
Fisher	0	0	0	15	0	15	0.000	0	0	1	5	0	6	0.167
Total	4	3	28	8	0	91	0.000	29	13	26	5	0	73	0.185

[a] Tracks without estimated measurements used for training (calibration) dataset.

[b] Tracks with estimated measurements used for test (validation) dataset.

[c] LTW = Long-tailed weasel

Table 31. Number of tracks identified by species and classified by discriminant analysis (k-nearest-neighbor, k=1, proportional) into four statistical categories for weasels. Tracks without estimated and with estimated measurements used for training and test data, respectively.

	Training [a]						Test [b]					
From Species	Into Statistical Categories for Weasels				Total	Error	Into Statistical Categories for Weasels				Total	Error
	Ermine	Mink	Fisher	Other			Ermine	Mink	Fisher	Other		
Random sample of tracks selected for training dataset [a]												
Ermine	6	0	0	0	6	0.000	29	7	0	0	36	0.194
Mink	0	29	0	0	29	0.000	4	27	0	0	31	0.129
Fisher	0	0	8	0	8	0.000	0	1	5	0	6	0.168
Total	6	29	8	0	43	0.000	33	35	5	0	73	0.145
All tracks included in training dataset [a]												
Ermine	12	0	0	0	12	0.000	35	1	0	0	36	0.028
Mink	0	64	0	0	64	0.000	5	26	0	0	31	0.161
Fisher	0	0	15	0	15	0.000	0	1	5	0	6	0.168
Total	6	64	8	0	91	0.000	40	28	5	0	73	0.145

[a] Tracks without estimated measurements used for training (calibration) dataset.

[b] Tracks with estimated measurements used for test (validation) dataset.

Table 32. Stations categorized by the number of visits by mink (not including visits documented from tracks that were identified initially as possibly made by long-tailed weasels) during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods.

Season	Drainage	Near Station					Far Station								
		Stations	Number of Visits to Station				Stations	Number of Visits to Station							
			0	1	2	3		0	1	2	3	4	5	6	7
						Track-plate record only									
Fall	Hudson	13	10	0	2	1	16	8	5	3	0	0	0	0	0
	Mohawk	17	9	5	1	2	23	12	7	2	0	2	0	0	0
Spring	Hudson	14	8	4	2	0	17	7	8	1	0	1	0	0	0
	Mohawk	17	8	7	2	0	25	13	7	2	1	1	1	0	0
						Track-plate record plus observed mink									
Fall	Hudson	13	10	0	2	1	16	8	5	3	0	0	0	0	0
	Mohawk	17	8	6	1	2	23	12	7	2	0	2	0	0	0
Spring	Hudson	14	8	4	2	0	17	7	7	2	0	1	0	0	0
	Mohawk	17	8	7	2	0	25	13	7	2	1	1	1	0	0
						Track-plate record plus observed mink plus mink tracks near station									
Fall	Hudson	13	10	0	2	1	16	8	5	3	0	0	0	0	0
	Mohawk	17	8	6	1	2	23	11	7	3	0	2	0	0	0
Spring	Hudson	14	6	4	2	2	17	5	7	3	1	0	1	0	0
	Mohawk	17	5	7	5	0	25	10	8	2	1	2	1	0	1

Table 33. Stations categorized by the number of visits by mink (including visits documented from tracks that were identified initially as possibly made by long-tailed weasels) during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods.

Season	Drainage	Near Station						Far Station								
		Stations	Number of Visits to Station					Stations	Number of Visits to Station							
			0	1	2	3	4		0	1	2	3	4	5	6	7
							Track-plate record only									
Fall	Hudson	13	10	0	2	1	0	16	8	4	4	0	0	0	0	0
	Mohawk	17	9	4	2	2	0	23	11	7	3	0	1	1	0	0
Spring	Hudson	14	8	4	2	0	0	17	7	8	0	1	1	0	0	0
	Mohawk	17	8	6	2	1	0	25	13	7	2	1	1	1	0	0
							Track-plate record plus observed mink									
Fall	Hudson	13	10	0	2	1	0	16	8	4	4	0	0	0	0	0
	Mohawk	17	8	5	2	2	0	23	11	7	3	0	1	1	0	0
Spring	Hudson	14	8	4	2	0	0	17	7	7	1	1	1	0	0	0
	Mohawk	17	8	6	2	1	0	25	13	7	2	1	1	1	0	0
							Track-plate record plus observed mink plus mink tracks near station									
Fall	Hudson	13	10	0	2	1	0	16	8	4	4	0	0	0	0	0
	Mohawk	17	8	5	2	2	0	23	10	7	4	0	1	1	0	0
Spring	Hudson	14	6	4	2	2	0	17	5	7	2	2	0	1	0	0
	Mohawk	17	5	6	5	0	1	25	10	8	2	1	2	1	0	1

Table 34. Categorical analysis of mink visits to scent stations located in the Hudson and Mohawk drainages during 2000-2001. Visits for mink do not include visits documented from tracks that were identified initially as possibly made by long-tailed weasels.

Season	Drainage	Near Stations					Far Stations				
		No Visits	1 or More	Total	χ^2	Prob	No Visits	1 or More	Total	χ^2	Prob
					Track-plate record only						
Fall[1]	Hudson	10	3	13	1.82	0.177	8	8	16	0.018	0.894
	Mohawk	9	8	17			12	11	23		
Spring[2]	Hudson	8	6	14	0.313	0.576	7	10	17	0.475	0.491
	Mohawk	8	9	17			13	12	25		
					Track-plate record plus observed mink						
Fall	Hudson	10	3	13	2.74	0.098	8	8	16	0.018	0.894
	Mohawk	8	9	17			12	11	23		
Spring	Hudson	8	6	14	0.313	0.576	7	10	17	0.475	0.491
	Mohawk	8	9	17			13	12	25		
					Track-plate record plus observed mink and mink tracks near stations						
Fall	Hudson	10	3	13	2.74	0.098	8	8	16	0.018	0.894
	Mohawk	8	9	17			11	12	23		
Spring	Hudson	6	8	14	0.606	0.436	5	12	17	0.494	0.482
	Mohawk	5	12	17			10	15	25		

[1] Fall period: 9/26/2000 to 12/12/2000. [2] Spring period: 1/3/2001 to 3/27/2001.

Table 35. Categorical analysis mink visits to scent stations located in the Hudson and Mohawk drainages during 2000-2001. Visits for mink include visits documented from tracks that were identified initially as possibly made by long-tailed weasels.

Season	Drainage	Near Stations					Far Stations				
		No Visits	1 or More	Total	χ^2	Prob	No Visits	1 or More	Total	χ^2	Prob
					Track-plate record only						
Fall[1]	Hudson	10	3	13	1.82	0.177	8	8	16	0.018	0.894
	Mohawk	9	8	17			11	12	23		
Spring[2]	Hudson	8	6	14	0.313	0.576	7	10	17	0.475	0.491
	Mohawk	8	9	17			13	12	25		
					Track-plate record plus observed mink						
Fall	Hudson	10	3	13	2.74	0.098	8	8	16	0.018	0.894
	Mohawk	8	9	17			11	12	23		
Spring	Hudson	8	6	14	0.313	0.576	7	10	17	0.475	0.491
	Mohawk	8	9	17			13	12	25		
					Track-plate record plus observed mink and mink tracks near stations						
Fall	Hudson	10	3	13	2.74	0.098	8	8	16	0.162	0.688
	Mohawk	8	9	17			10	13	23		
Spring	Hudson	6	8	14	0.606	0.436	5	12	17	0494	0482
	Mohawk	5	12	17			10	15	25		

[1] Fall period: 9/26/2000 to 12/12/2000. [2] Spring period: 1/3/2001 to 3/27/2001.

Table 36. Stations categorized by the number of visits by ermine during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Near Station					Far Station						
		Stations	Number of Visits to Station				Stations	Number of Visits to Station					
			0	1	2	3		0	1	2	3	4	5
						Ermine							
Fall	Hudson	13	12	1	0	0	16	12	4	0	0	0	0
	Mohawk	17	14	3	0	0	23	21	1	1	0	0	0
Spring	Hudson	14	8	6	0	0	17	10	3	2	1	0	1
	Mohawk	17	8	7	1	1	25	19	3	2	1	0	0
						Ermine plus long-tailed weasels that are possibly ermine							
Fall	Hudson	13	12	0	1	0	16	12	3	1	0	0	0
	Mohawk	17	14	3	0	0	23	21	1	1	0	0	0
Spring	Hudson	14	8	6	0	0	17	9	3	3	1	0	1
	Mohawk	17	8	5	2	2	25	18	4	2	1	0	0

Table 37. Stations categorized by the number of visits by possible long-tailed weasels during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Near Station					Far Station			
		Stations	Number of Visits to Station				Stations	Number of Visits to Station		
			0	1	2	3		0	1	2
Fall	Hudson	13	12	1	0	0	16	14	2	0
	Mohawk	17	15	2	0	0	23	20	3	0
Spring	Hudson	14	14	0	0	0	17	15	1	1
	Mohawk	17	14	0	2	1	25	23	2	0

Table 38. Stations categorized by the number of visits by fisher during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Near Station						Far Station					
		Stations	Number of Visits to Station					Stations	Number of Visits to Station				
			0	1	2	3	4		0	1	2	3	4
Fall	Hudson	13	10	1	1	1	0	16	15	1	0	0	0
	Mohawk	17	17	0	0	0	0	23	22	0	0	0	1
Spring	Hudson	14	9	2	2	0	1	17	12	3	2	0	0
	Mohawk	17	17	0	0	0	0	25	23	1	1	0	0

Table 39. Categorical analysis of ermine visits to scent stations located in the Hudson and Mohawk drainages during 2000-2001. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Near Stations					Far Stations				
		No Visits	1 or More	Total	χ^2	Prob	No Visits	1 or More	Total	χ^2	Prob
					Ermine only						
Fall[1]	Hudson	12	1	13	0.632	0.427	12	4	16	1.93	0.165
	Mohawk	14	3	17			21	2	23		
Spring[2]	Hudson	8	6	14	0.313	0.576	10	7	17	1.40	0.237
	Mohawk	8	9	17			19	6	25		
					Ermine plus long-tailed weasels that are possibly ermine						
Fall	Hudson	12	1	13	0.632	0.427	12	4	16	1.93	0.165
	Mohawk	14	3	17			21	2	23		
Spring	Hudson	8	6	14	0.313	0.576	9	8	17	1.60	0.206
	Mohawk	8	9	17			18	7	25		

[1] Fall period: 9/26/2000 to 12/12/2000. [2] Spring period: 1/3/2001 to 3/27/2001.

Table 40. Categorical analysis of possible long-tailed weasel visits to scent stations located in the Hudson and Mohawk drainages during 2000-2001. Long-tailed weasels were also identified as probable mink or ermine and included in the categorical analysis of mink and ermine visits. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Near Stations					Far Stations				
		No Visits	1 or More	Total	χ^2	Prob	No Visits	1 or More	Total	χ^2	Prob
Fall[1]	Hudson	12	1	13	0.136	0.713	14	2	16	0.003	0.960
	Mohawk	15	2	17			20	3	23		
Spring[2]	Hudson	14	0	14	2.74	0.098	15	2	17	0.166	0.683
	Mohawk	14	3	17			23	2	25		

[1] Fall period: 9/26/2000 to 12/12/2000. [2] Spring period: 1/3/2001 to 3/27/2001.

Table 41. Categorical analysis of fisher visits to scent stations located in the Hudson and Mohawk drainages during 2000-2001. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Near Stations					Far Stations				
		No Visits	1 or More	Total	χ^2	Prob	No Visits	1 or More	Total	χ^2	Prob
Fall[1]	Hudson	10	3	13	4.36	0.037	15	1	16	0.070	0.791
	Mohawk	17	0	17			22	1	23		
Spring[2]	Hudson	9	5	14	7.24	0..007	12	5	17	3.34	0.068
	Mohawk	17	0	17			23	2	25		

[1] Fall period: 9/26/2000 to 12/12/2000. [2] Spring period: 1/3/2001 to 3/27/2001.

Table 42. Stations categorized according to the total number of visits by Eastern chipmunk during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Stations	Number of Visits to Station									
			0	1	2	3	4	5	6	7	8	9
						Near Station						
Fall	Hudson	13	3	3	1	3	2	1	0	0	0	0
	Mohawk	17	1	4	4	3	2	1	0	1	0	1
Spring	Hudson	14	6	4	2	1	0	1	0	0	0	0
	Mohawk	17	10	3	2	1	0	1	0	0	0	0
						Far Station						
Fall	Hudson	16	4	3	2	4	1	1	0	0	1	0
	Mohawk	23	4	2	5	1	2	4	1	2	1	1
Spring	Hudson	17	6	4	3	2	0	0	2	0	0	0
	Mohawk	25	10	4	4	3	2	0	2	0	0	0

Table 43. Stations categorized by the number of visits by red squirrel during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Stations	Number of Visits to Station											
			0	1	2	3	4	5	6	7	8	9	10	11
							Near Station							
Fall	Hudson	13	8	3	1	0	0	1	0	0	0	0	0	0
	Mohawk	17	10	4	2	1	0	0	0	0	0	0	0	0
Spring	Hudson	14	6	3	2	1	2	0	0	0	0	0	0	0
	Mohawk	17	12	4	0	1	0	0	0	0	0	0	0	0
							Far Station							
Fall	Hudson	16	12	2	0	0	0	1	0	0	1	0	0	0
	Mohawk	23	15	0	4	2	2	0	0	0	0	0	0	0
Spring	Hudson	17	6	7	1	1	0	0	0	0	1	0	0	1
	Mohawk	25	12	4	3	1	2	1	1	1	0	0	0	0

Table 44. Stations categorized by the number of visits by Eastern gray squirrel during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Stations	Number of Visits to Station											
			0	1	2	3	4	5	6	7	8	9	10	11
							Near Station							
Fall	Hudson	13	7	3	1	1	0	1	0	0	0	0	0	0
	Mohawk	17	9	2	4	1	0	1	0	0	0	0	0	0
Spring	Hudson	14	7	3	3	0	0	0	0	1	0	0	0	0
	Mohawk	17	9	3	1	4	0	0	0	0	0	0	0	0
							Far Station							
Fall	Hudson	16	8	7	1	0	0	0	0	0	0	0	0	0
	Mohawk	23	9	8	1	2	1	0	0	0	1	0	0	1
Spring	Hudson	17	8	4	2	3	0	0	0	0	0	0	0	0
	Mohawk	25	6	9	4	2	1	1	1	0	0	1	0	0

Table 45. Categorical analysis of visits from three squirrel species to scent stations located in the Hudson and Mohawk drainages during 2000-2001. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Near Stations					Far Stations				
		No Visits	1 or More	Total	χ^2	Prob	No Visits	1 or More	Total	χ^2	Prob
					Eastern Gray Squirrels						
Fall[1]	Hudson	7	6	13	0.002	0.961	8	8	16	0.453	0.501
	Mohawk	9	8	17			9	14	23		
Spring[2]	Hudson	7	7	14	0.027	0.871	8	9	17	2.42	0.120
	Mohawk	9	8	17			6	19	25		
					Red Squirrels						
Fall	Hudson	8	5	13	0.023	0.880	12	4	16	0.424	0.515
	Mohawk	10	7	17			15	8	23		
Spring	Hudson	6	8	14	2.42	0.119	6	11	17	0.667	0.414
	Mohawk	12	5	17			12	13	25		
					Eastern Chipmunks						
Fall	Hudson	3	10	13	1.88	0.170	4	12	16	0.335	0.563
	Mohawk	1	16	17			4	19	23		
Spring	Hudson	6	8	14	0.784	0.376	6	11	17	0.095	0.758
	Mohawk	10	7	17			10	15	25		

[1] Fall period: 9/26/2000 to 12/12/2000. [2] Spring period: 1/3/2001 to 3/27/2001.

Table 46. Stations categorized by the number of visits by raccoon during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Stations	Number of Visits to Station										
			0	1	2	3	4	5	6	7	8	9	10
						Near Station							
Fall	Hudson	13	4	2	3	1	3	0	0	0	0	0	0
	Mohawk	17	6	6	2	1	0	1	0	0	1	0	0
Spring	Hudson	14	12	0	1	0	0	0	1	0	0	0	0
	Mohawk	17	11	4	0	0	0	0	1	0	0	0	1
						Far Station							
Fall	Hudson	16	8	4	2	1	0	0	0	0	1	0	0
	Mohawk	23	9	2	3	4	1	1	1	1	1	0	0
Spring	Hudson	17	12	4	0	0	0	0	0	0	0	0	1
	Mohawk	25	15	6	3	1	0	0	0	0	0	0	0

Table 47. Stations categorized by the number of visits by feral cat during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Stations	Number of Visits to Station								
			0	1	2	3	4	5	6	7	8
					Near Station						
Fall	Hudson	13	3	2	5	2	1	0	0	0	0
	Mohawk	17	4	3	4	2	1	2	1	0	0
Spring	Hudson	14	10	3	1	0	0	0	0	0	0
	Mohawk	17	11	1	2	2	0	1	0	0	0
					Far Station						
Fall	Hudson	16	6	4	2	2	2	0	0	0	0
	Mohawk	23	6	6	3	4	2	1	0	0	1
Spring	Hudson	17	13	3	1	0	0	0	0	0	0
	Mohawk	25	16	3	3	1	2	0	0	0	0

Table 48. Stations categorized by the number of visits by rabbit during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Stations	Number of Visits to Station							
			0	1	2	3	4	5	6	7
					Near Station					
Fall	Hudson	13	7	3	2	0	0	0	0	1
	Mohawk	17	4	3	5	2	1	2	0	0
Spring	Hudson	14	12	0	1	1	0	0	0	0
	Mohawk	17	11	4	2	0	0	0	0	0
					Far Station					
Fall	Hudson	16	9	5	2	0	0	0	0	0
	Mohawk	23	15	1	2	3	1	0	1	0
Spring	Hudson	17	15	2	0	0	0	0	0	0
	Mohawk	25	22	2	0	1	0	0	0	0

Table 49. Stations categorized by the number of visits by striped skunk during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Near Station						Far Station			
		Stations	Number of Visits to Station					Stations	Number of Visits to Station		
			0	1	2	3	4		0	1	2
Fall	Hudson	13	10	2	0	1	0	16	15	0	1
	Mohawk	17	15	1	0	0	1	23	17	4	2
Spring	Hudson	14	9	5	0	0	0	17	17	0	0
	Mohawk	17	15	2	0	0	0	25	25	0	0

Table 50. Stations categorized by the number of visits by Virginia opossum during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Stations	Number of Visits to Station									
			0	1	2	3	4	5	6	7	8	9
						Near Station						
Fall	Hudson	13	5	3	3	1	0	1	0	0	0	0
	Mohawk	17	1	3	7	2	1	3	0	0	0	0
Spring	Hudson	14	12	0	2	0	0	0	0	0	0	0
	Mohawk	17	13	3	0	0	0	0	1	0	0	0
						Far Station						
Fall	Hudson	16	12	2	0	1	1	0	0	0	0	0
	Mohawk	23	8	5	7	1	1	0	0	0	0	1
Spring	Hudson	17	15	1	0	0	0	1	0	0	0	0
	Mohawk	25	23	1	1	0	0	0	0	0	0	0

Table 51. Stations categorized by the number of visits by small mammals (mice/voles/shrews) during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Stations	Number of Visits to Station												
			Near Station												
			0	1	2	3	4	5	6	7	8	9	10	11	12
Fall	Hudson	13	0	0	0	0	0	0	3	0	3	2	3	2	0
	Mohawk	17	0	0	0	0	0	0	0	1	0	2	4	10	0
Spring	Hudson	14	0	0	0	1	0	0	2	1	7	1	1	0	1
	Mohawk	17	0	0	0	0	0	1	2	1	1	1	2	4	5
			Far Station												
Fall	Hudson	16	0	0	0	0	1	2	0	2	2	7	2	0	0
	Mohawk	23	0	0	0	0	0	1	1	2	2	2	10	5	0
Spring	Hudson	17	0	0	1	0	4	0	1	2	2	1	3	3	0
	Mohawk	25	0	0	1	0	0	2	2	1	2	4	5	3	5

Table 52. Categorical analysis of raccoon visits to scent stations located in the Hudson and Mohawk drainages during 2000-2001. Visits to scent stations were documented from tracks recorded on track plates.

		Near Stations					Far Stations				
Season	Drainage	No Visits	1 or More	Total	χ^2	Prob	No Visits	1 or More	Total	χ^2	Prob
Fall[1]	Hudson	4	9	13	0.068	0.795	8	8	16	0.453	0.501
	Mohawk	6	11	17			9	14	23		
Spring[2]	Hudson	12	2	14	1.77	0.183	12	5	17	0.494	0.482
	Mohawk	11	6	17			15	10	25		

[1] Fall period: 9/26/2000 to 12/12/2000. [2] Spring period: 1/3/2001 to 3/27/2001.

Table 53. Categorical analysis of feral cat visits to scent stations located in the Hudson and Mohawk drainages during 2000-2001. Visits to scent stations were documented from tracks recorded on track plates.

		Near Stations					Far Stations				
Season	Drainage	No Visits	1 or More	Total	χ^2	Prob	No Visits	1 or More	Total	χ^2	Prob
Fall[1]	Hudson	3	10	13	0.001	0.977	6	10	16	0.557	0.448
	Mohawk	4	13	17			6	17	23		
Spring[2]	Hudson	10	4	14	1.59	0.690	13	4	17	0.736	0.391
	Mohawk	11	6	17			16	9	25		

[1] Fall period: 9/26/2000 to 12/12/2000. [2] Spring period: 1/3/2001 to 3/27/2001.

Table 54. Categorical analysis of rabbit visits to scent stations located in the Hudson and Mohawk drainages during 2000-2001. Visits to scent stations were documented from tracks recorded on track plates.

		Near Stations					Far Stations				
Season	Drainage	No Visits	1 or More	Total	χ^2	Prob	No Visits	1 or More	Total	χ^2	Prob
Fall[1]	Hudson	7	6	13	2.92	0.088	9	7	16	0.321	0.571
	Mohawk	4	13	17			15	8	23		
Spring[2]	Hudson	12	2	14	1.77	0.183	15	2	17	0.001	0.982
	Mohawk	11	6	17			22	3	25		

[1] Fall period: 9/26/2000 to 12/12/2000. [2] Spring period: 1/3/2001 to 3/27/2001.

Table 55. Categorical analysis of striped skunk visits to scent stations located in the Hudson and Mohawk drainages during 2000-2001. Visits to scent stations were documented from tracks recorded on track plates.

		Near Stations					Far Stations				
Season	Drainage	No Visits	1 or More	Total	χ^2	Prob	No Visits	1 or More	Total	χ^2	Prob
Fall[1]	Hudson	10	3	13	0.679	0.410	15	1	16	2.52	0.112
	Mohawk	15	2	17			17	6	23		
Spring[2]	Hudson	9	5	14	2.52	0.112	17	0	17	-	-
	Mohawk	15	2	17			25	0	25		

[1] Fall period: 9/26/2000 to 12/12/2000. [2] Spring period: 1/3/2001 to 3/27/2001.

Table 56. Categorical analysis of Virginia opossum visits to scent stations located in the Hudson and Mohawk drainages during 2000-2001. Visits to scent stations were documented from tracks recorded on track plates.

		Near Stations					Far Stations				
Season	Drainage	No Visits	1 or More	Total	χ^2	Prob	No Visits	1 or More	Total	χ^2	Prob
Fall[1]	Hudson	5	8	13	4.89	0.027	12	4	16	6.11	0.014
	Mohawk	1	16	17			8	15	23		
Spring[2]	Hudson	12	2	14	0.420	0.517	15	2	17	0.166	0.683
	Mohawk	13	4	17			23	2	25		

[1] Fall period: 9/26/2000 to 12/12/2000. [2] Spring period: 1/3/2001 to 3/27/2001.

Table 57. Stations categorized by the number of visits by frogs and salamanders during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Near Station							Far Station							
		Stations	Number of Visits to Station						Stations	Number of Visits to Station						
			0	1	2	3	4	5		0	1	2	3	4	5	6
								Frog								
Fall	Hudson	13	4	3	1	3	1	1	16	7	6	0	3	0	0	0
	Mohawk	17	5	3	2	4	3	0	23	9	3	6	5	0	0	0
Spring	Hudson	14	14	0	0	0	0	0	17	17	0	0	0	0	0	0
	Mohawk	17	17	0	0	0	0	0	25	25	0	0	0	0	0	0
								Salamander								
Fall	Hudson	13	5	1	5	0	2	0	16	7	3	3	3	0	0	0
	Mohawk	17	6	4	2	4	1	0	23	7	5	5	1	2	2	1
Spring	Hudson	14	14	0	0	0	0	0	17	17	0	0	0	0	0	0
	Mohawk	17	17	0	0	0	0	0	25	25	0	0	0	0	0	0

Table 58. Categorical analysis of visits from frogs and salamanders to scent stations located in the Hudson and Mohawk drainages during 2000-2001. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Near Stations					Far Stations				
		No Visits	1 or More	Total	χ^2	Prob	No Visits	1 or More	Total	χ^2	Prob
					Frogs						
Fall[1]	Hudson	4	9	13	0.007	0.936	7	9	16	0.083	0.773
	Mohawk	5	12	17			9	14	23		
Spring[2]	Hudson	14	0	14	-	-	17	0	17	-	-
	Mohawk	17	0	17			25	0	25		
					Salamanders						
Fall	Hudson	5	8	13	0.032	0.858	7	9	16	0.727	0.394
	Mohawk	6	11	17			7	16	23		
Spring	Hudson	14	0	14	-	-	17	0	17	-	-
	Mohawk	17	0	17			25	0	25		

[1] Fall period: 9/26/2000 to 12/12/2000. [2] Spring period: 1/3/2001 to 3/27/2001.

Table 59. Stations categorized by the number of visits by birds during the fall (9/26/2000 to 12/12/2000) and spring (1/3/2001 to 3/27/2001) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

Season	Drainage	Near Station				Far Station				
		Stations	Number of Visits to Station			Stations	Number of Visits to Station			
			0	1	2		0	1	2	3
Fall	Hudson	13	10	3	0	16	14	2	0	0
	Mohawk	17	13	3	1	23	20	2	0	1
Spring	Hudson	14	13	1	0	17	17	0	0	0
	Mohawk	17	17	0	0	25	23	0	1	1

Table 60. Categorical analysis of visits from birds to scent stations located in the Hudson and Mohawk drainages during 2000-2001. Visits to scent stations were documented from tracks recorded on track plates.

		Near Stations					Far Stations				
Season	Drainage	No Visits	1 or More	Total	χ^2	Prob	No Visits	1 or More	Total	χ^2	Prob
Fall[1]	Hudson	10	3	13	0.001	0.977	14	2	16	0.003	0.960
	Mohawk	13	4	17			20	3	23		
Spring[2]	Hudson	13	1	14	1.25	0.263	17	0	17	1.43	0.232
	Mohawk	17	0	17			23	2	25		

[1] Fall period: 9/26/2000 to 12/12/2000. [2] Spring period: 1/3/2001 to 3/27/2001.

FIGURES

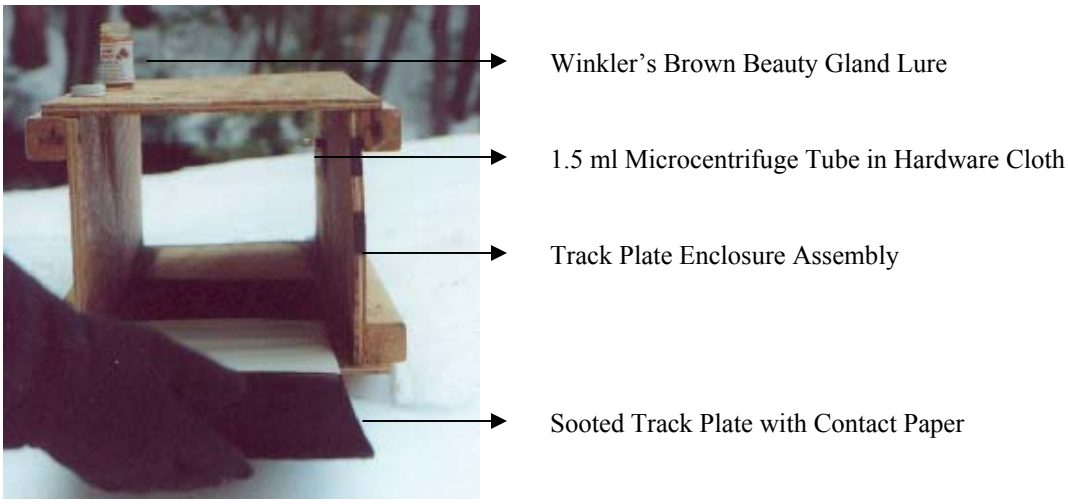
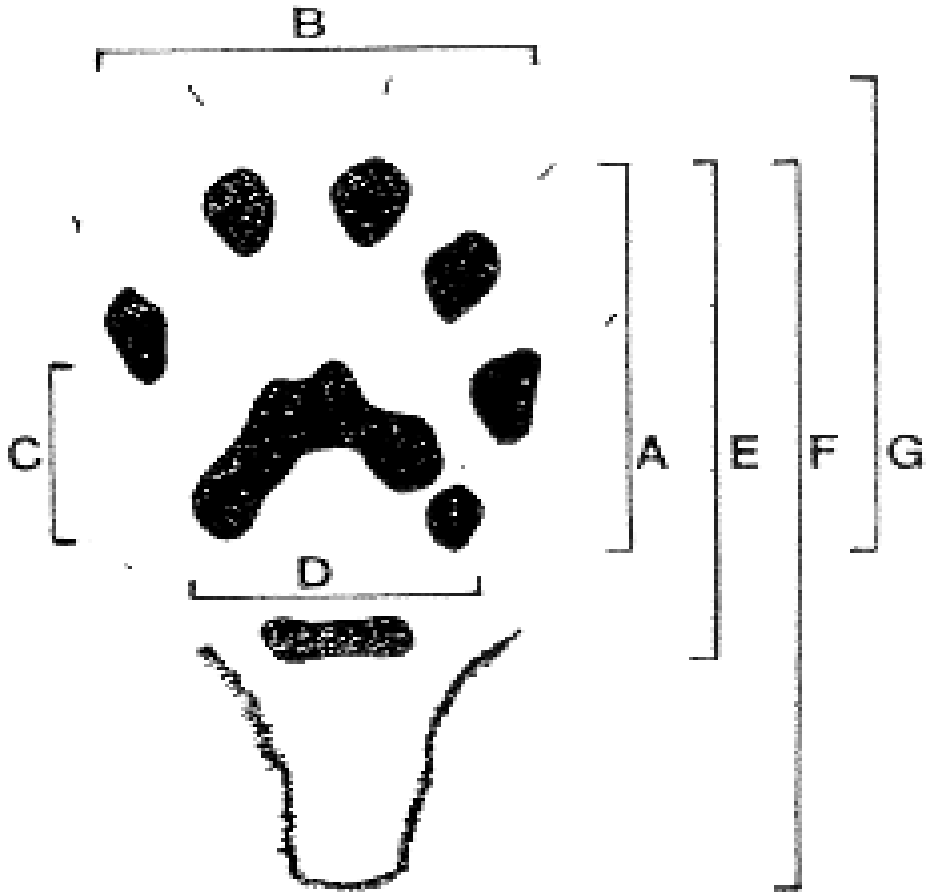


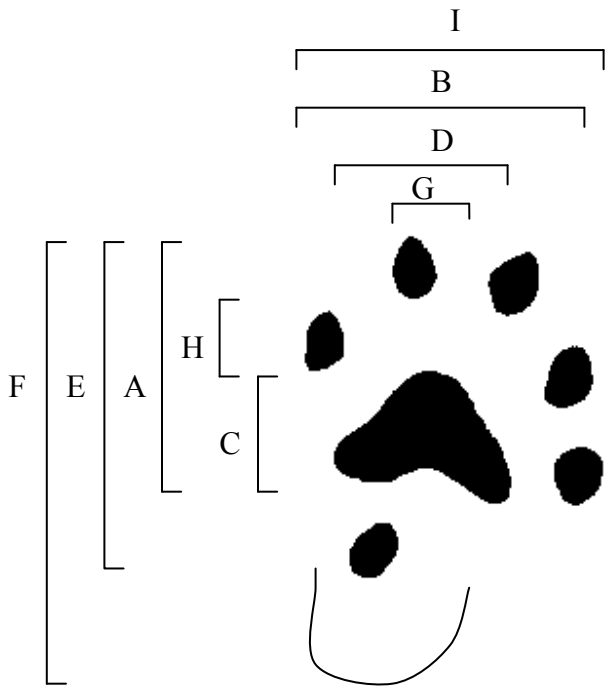
Figure 1. Track -plate enclosure with sooted track plate and lure vial in holder.

Figure 2. Track plates sooted with an acetylene torch.



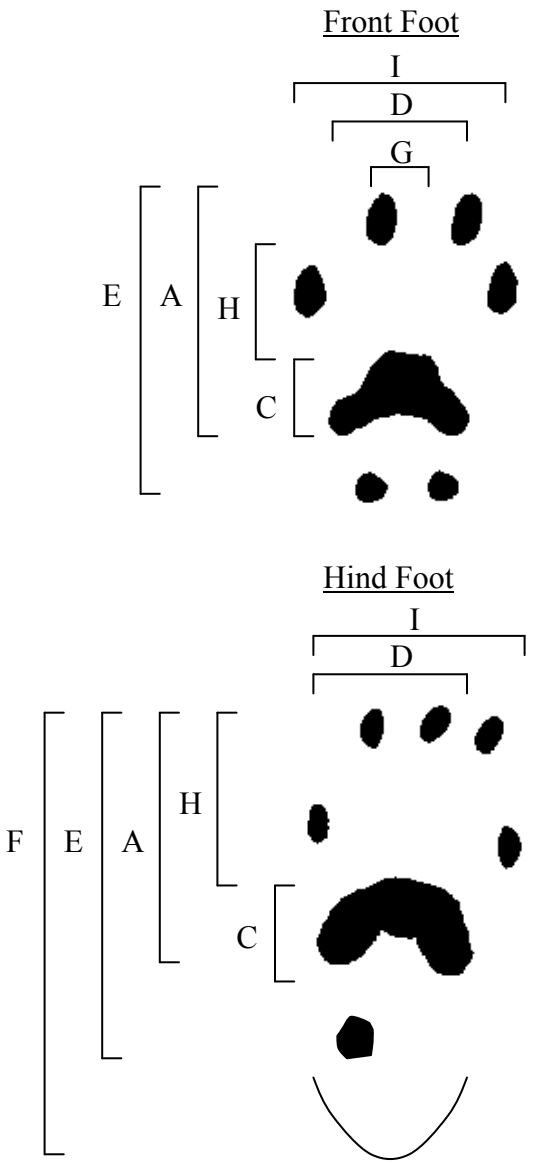
A-Longest vertical line drawn from distal edge of foremost toe to back edge of palm pad
B-Horizontal line measuring widest spread of toes
C-Height of the palm pads
D-Width of palm pads
E-Vertical distance from foremost toe to the back edge of heel pad
F-Distance from foremost toe to end of heel mark
G-Distance from foremost claw to back of palm pad.

Figure 3. Standard track measurements for medium- to large-sized mammals (Taylor and Raphael 1988).



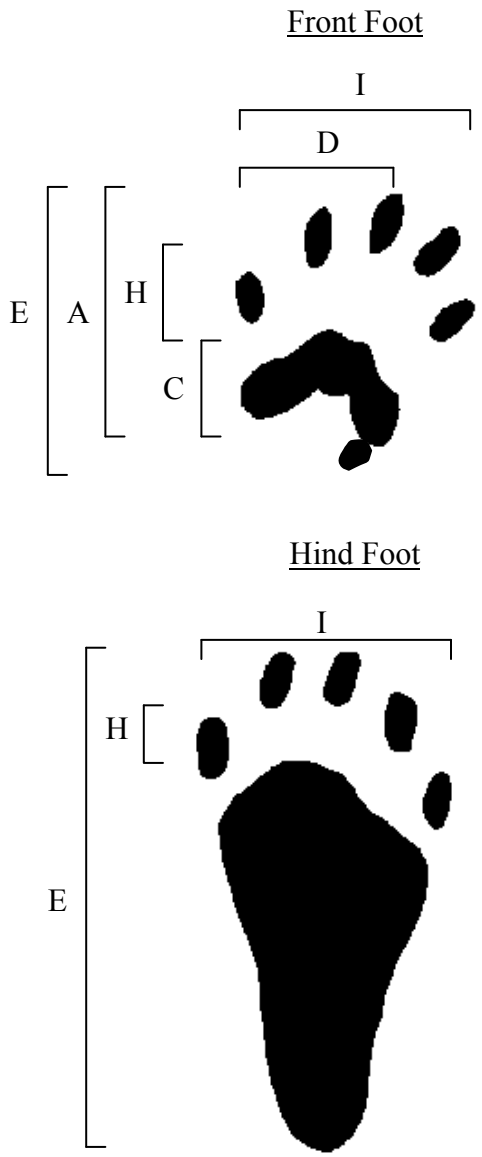
A-Maximum length from the distal edge of the foremost toe to the back edge of the palm pad
B-Width of the four foremost toes
C-Length of the palm pads
D-Width of the palm pads
E-Maximum length from the foremost toe to the back edge of the heel pad
F-Maximum length from the foremost toe to the end of the heel mark
G-Width of the palm pad at the mid-section
H-Length between the top of the palm pad and the back edge of the foremost toe
I- Widest spread of toes

Figure 4. Standard measurements taken for mink, long-tailed weasel, ermine and fisher tracks.



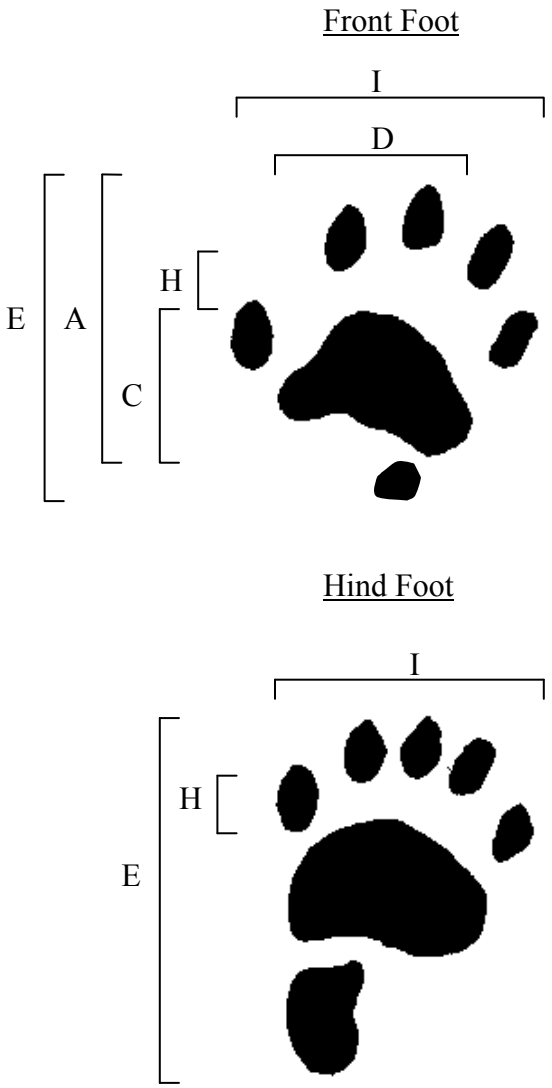
A-Maximum length from the distal edge of the foremost toe to the back edge of the palm pad
C-Length of the palm pads
D-Width of palm pads
E-Maximum length between the foremost toe to the back edge of the heel pad
F-Maximum length from the foremost toe to the end of the heel mark
G-Width of the palm pad at the mid-section
H-Length between the top of the palm pad to the back edge of the foremost toe
I- Widest spread of toes

Figure 5. Standard measurements taken for squirrel and chipmunk tracks



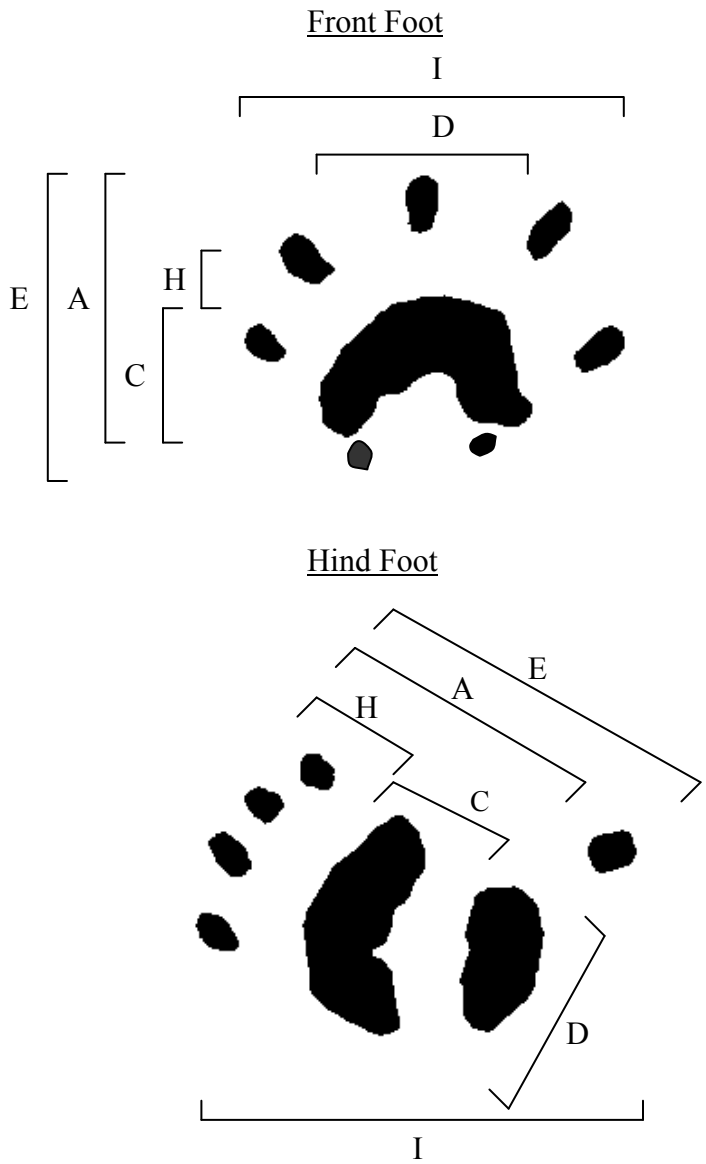
A-Maximum length from the distal edge of the foremost toe to the back edge of the palm pad
C-Length of the palm pads
D-Width of palm pads
E-Maximum length from the foremost toe to the back edge of the heel pad
H-Length between the top of the palm pad to the back edge of the foremost toe
I- Widest spread of toes

Figure 6. Standard measurements taken for raccoon tracks.



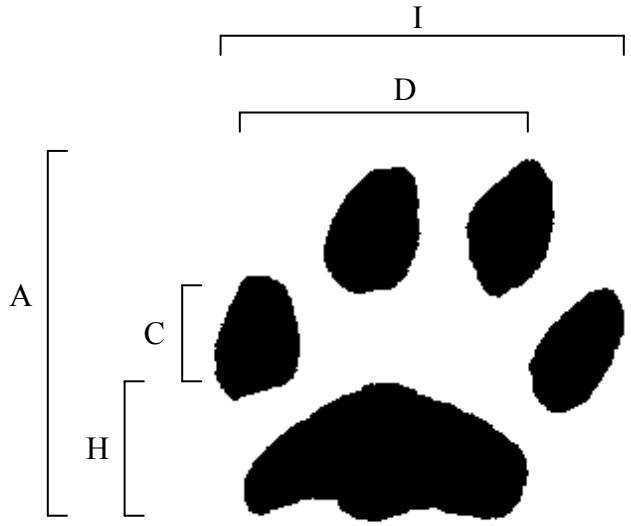
A-Maximum length from the distal edge of the foremost toe to the back edge of the palm pad
C-Length of the palm pads
D-Width of palm pads
E-Vertical distance from the foremost toe back to the edge of the heel pad
H-Length between the top of the palm pad to the back edge of the foremost toe
I- Widest spread of toes

Figure 7. Standard measurements taken for striped skunk tracks.



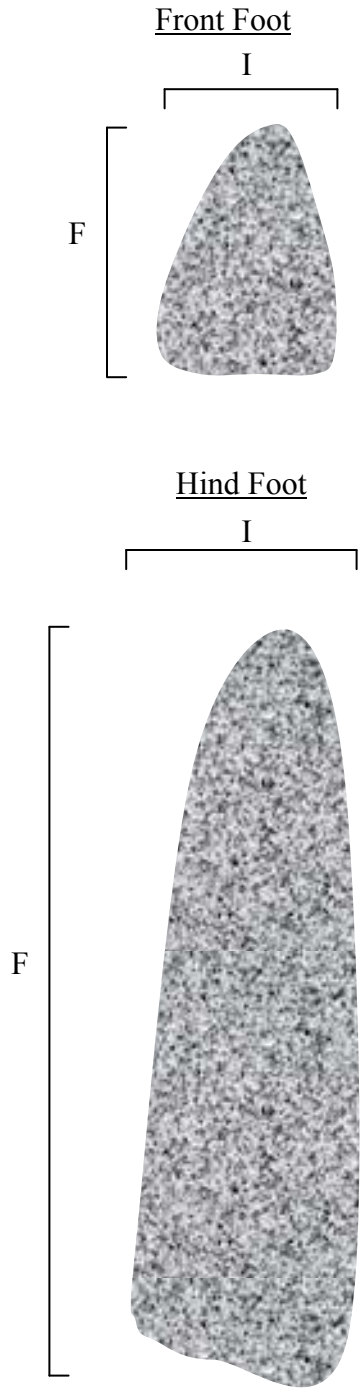
A-Maximum length from the distal edge of the foremost toe to the back edge of the palm pad.
C-Length of the palm pads
D-Width of palm pads
E-Maximum length the foremost toe to the back edge of the heel pad
H-Length between the top of the palm pad to the back edge of the foremost toe
I- Widest spread of toes

Figure 8. Standard measurements taken for Virginia opossum tracks.



A-Maximum length from the distal edge of the foremost to the back edge of the palm pad
C-Length of the palm pads
D-Width of palm pads
H-Length between the top of the palm pad to the back edge of the foremost toe
I- Widest spread of toes

Figure 9. Standard measurements taken for feral cat tracks.



F-Maximum length from the foremost toe to the end of the heel mark
I- Widest spread of toes

Figure 10. Standard measurements taken for cottontail rabbit tracks.

Figure 11. Plot of scent station location groups by drainage location by scheduled monitoring visit (nominal week). Each column represents visitation history for a specific scent station. A symbol indicates that either tracks were observed or, if no tracks were present, the track plates were capable of recording tracks at one or more enclosures at the station since the last monitoring visit. A blank indicates that no track plates could be observed for tracks at the station during the monitoring visit on that date indicating a total loss of record for the station and date.

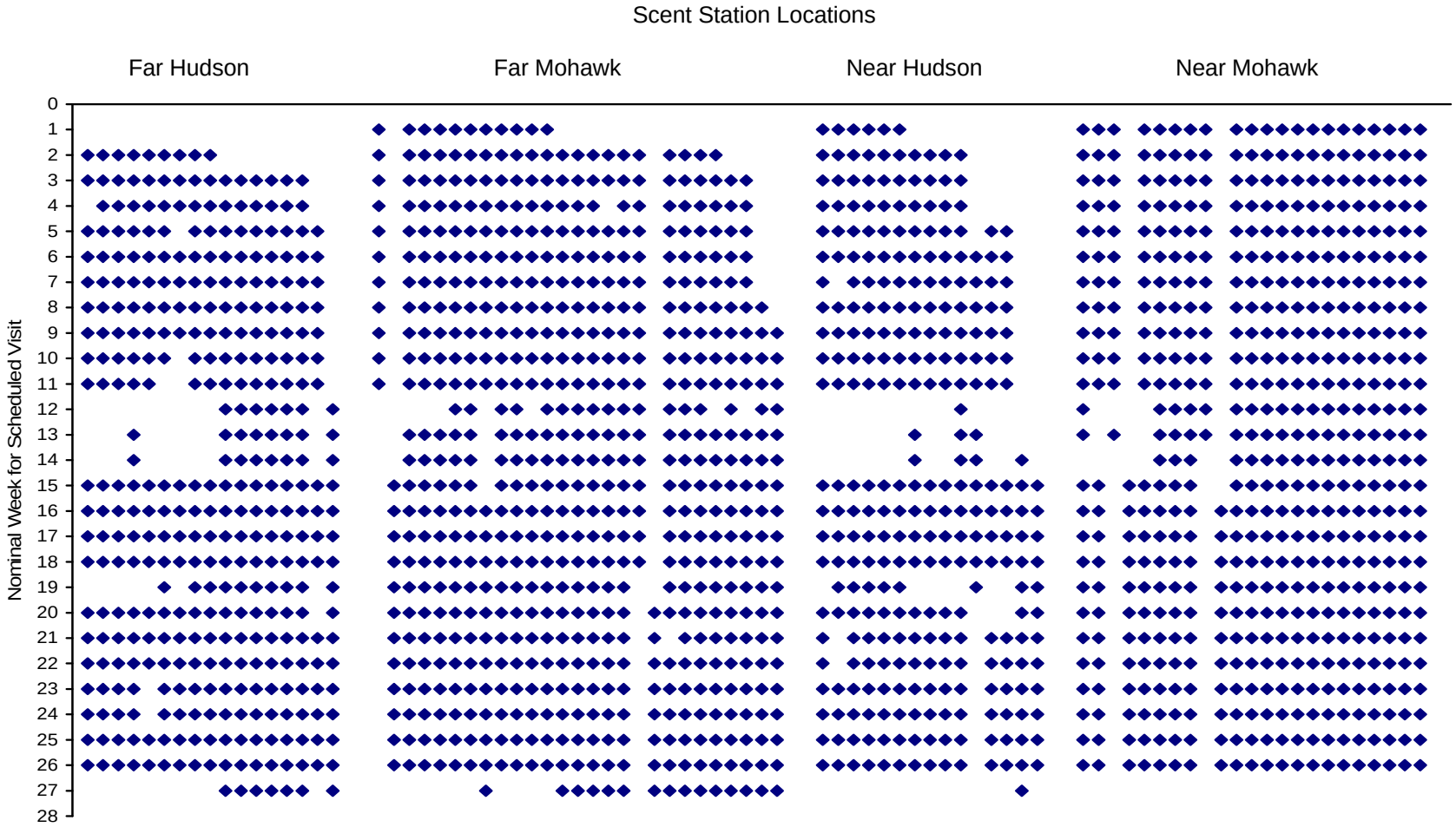
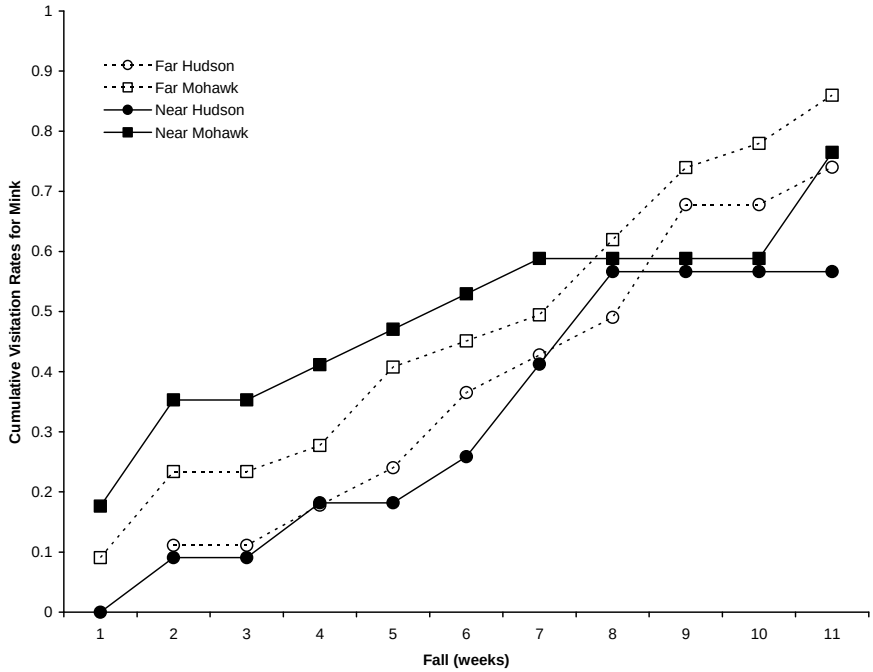

Scent Station Locations
Far Hudson
Far Mohawk
Near Hudson
Near Mohawk
Nominal Week for Scheduled Visit
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

Figure 12. Graphs of cumulative visitation rates for mink within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates. Visits for mink do not include visits documented from tracks that were identified initially as possibly made by long-tailed weasels.



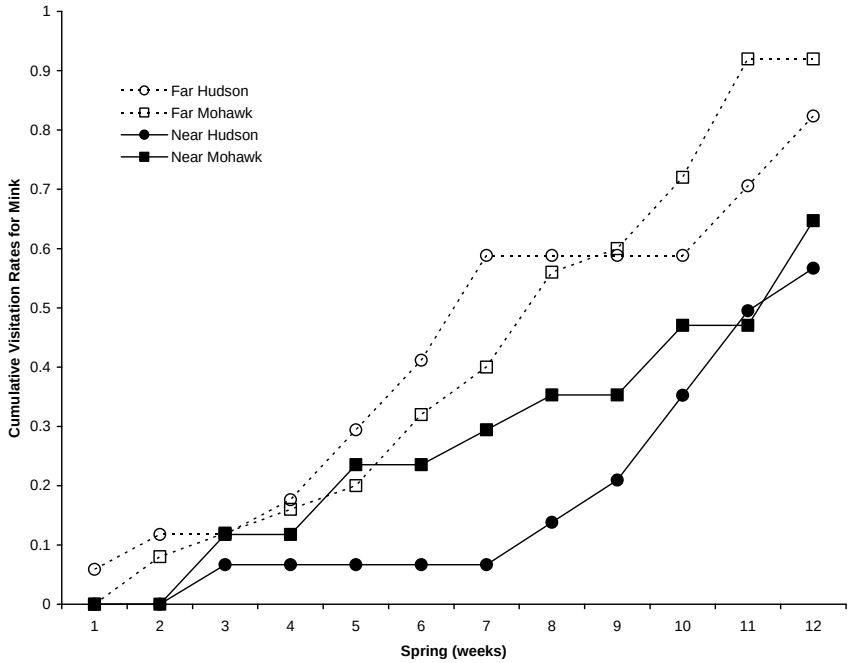
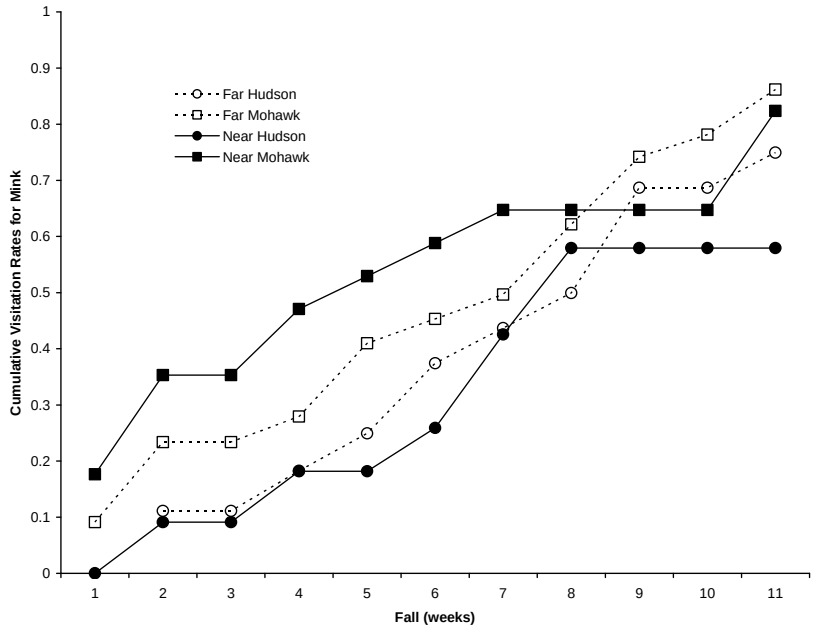


Figure 13. Graphs of cumulative visitation rates for mink within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates and included dates when mink were observed at stations. Visits for mink do not include visits documented from tracks that were identified initially as possibly made by long-tailed weasels.



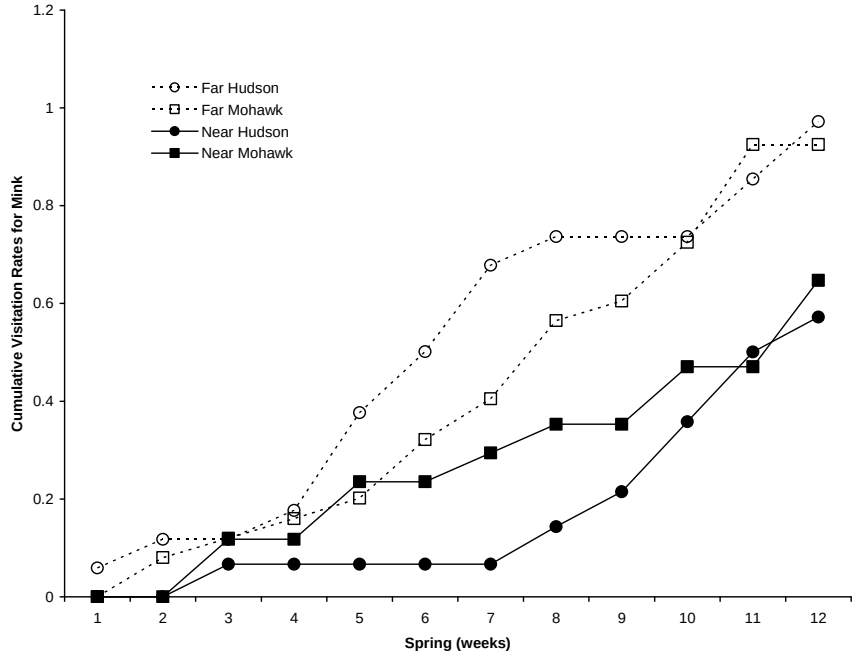
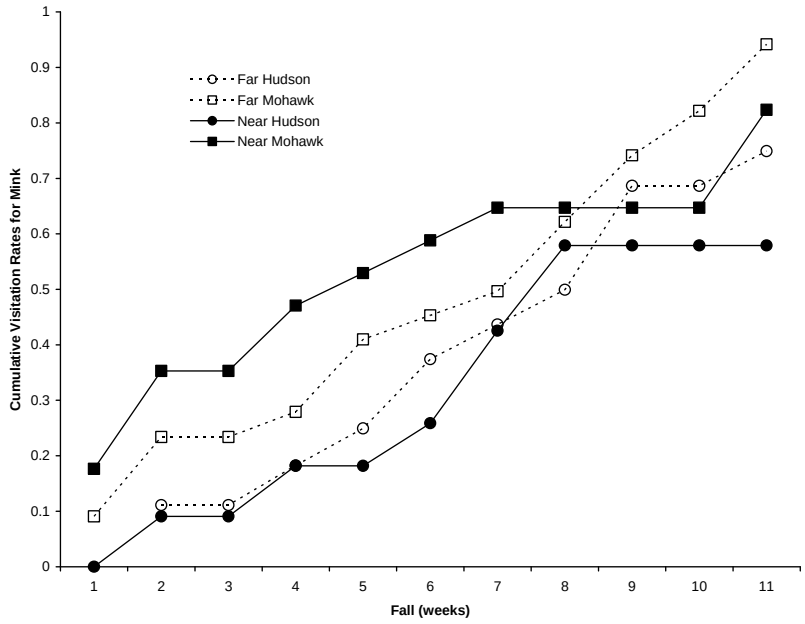


Figure 14. Graphs of cumulative visitation rates for mink within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates and included dates when mink were observed at stations or mink tracks were observed in mud or snow near stations. Visits for mink do not include visits documented from tracks that were identified initially as possibly made by long-tailed weasels.



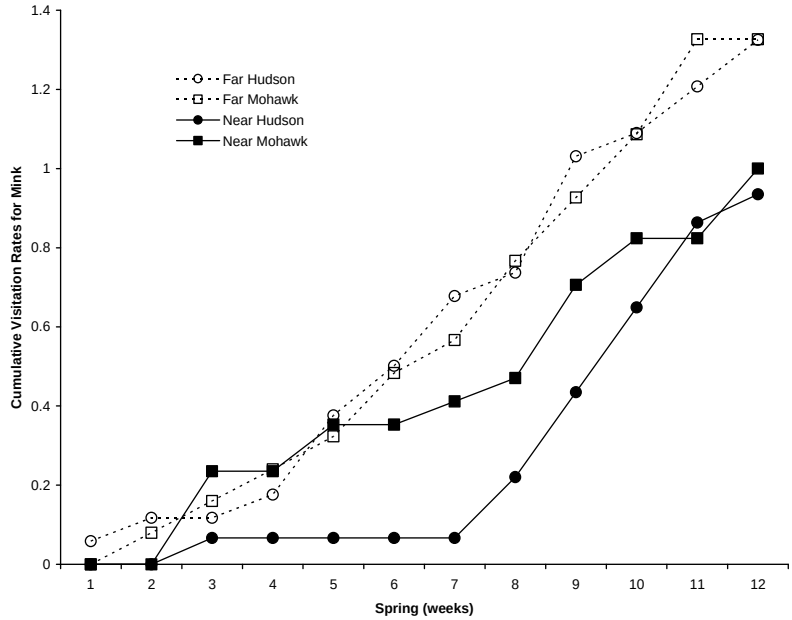


Figure 15. Graphs of cumulative visitation rates for mink within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates. Visits for mink include visits documented from tracks that were identified initially as possibly made by long-tailed weasels.

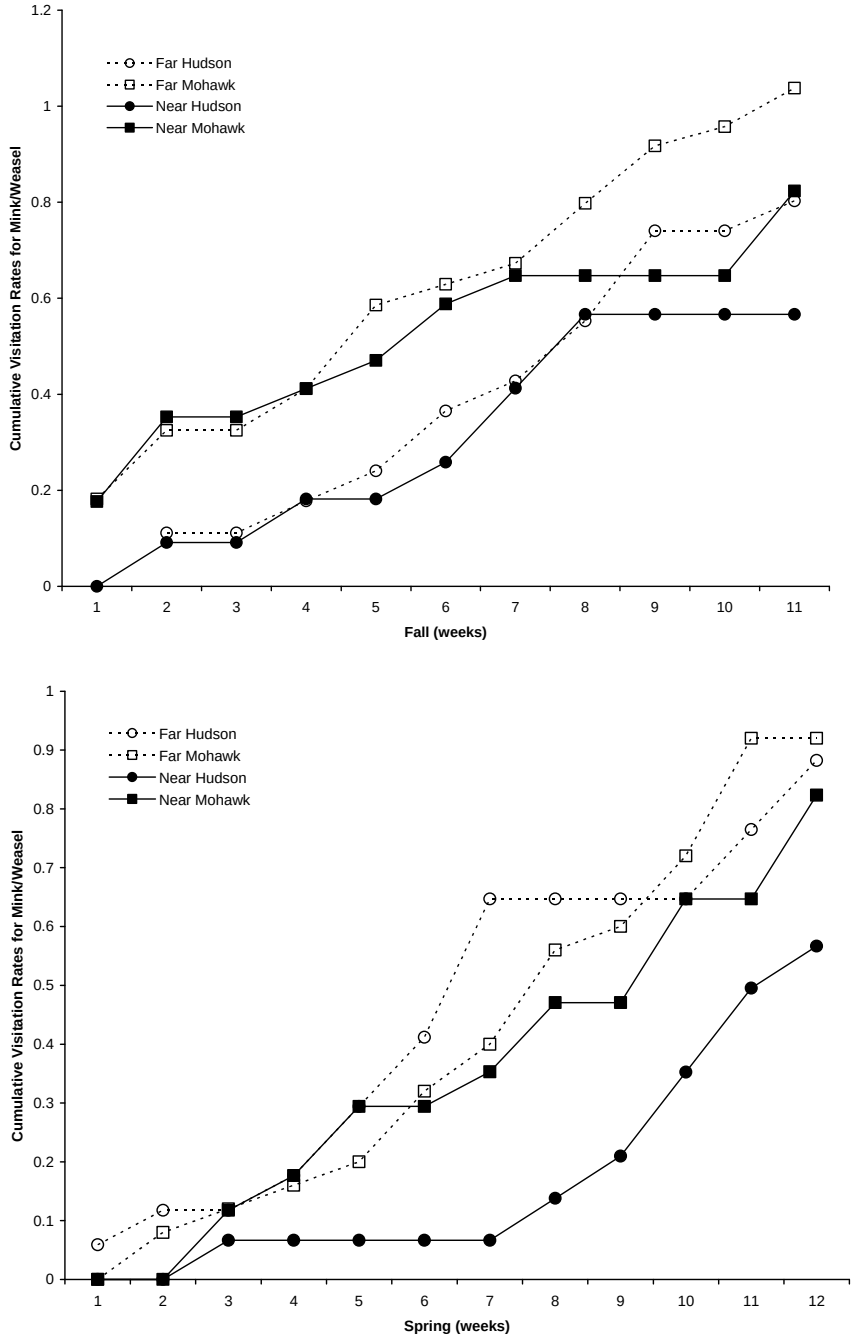
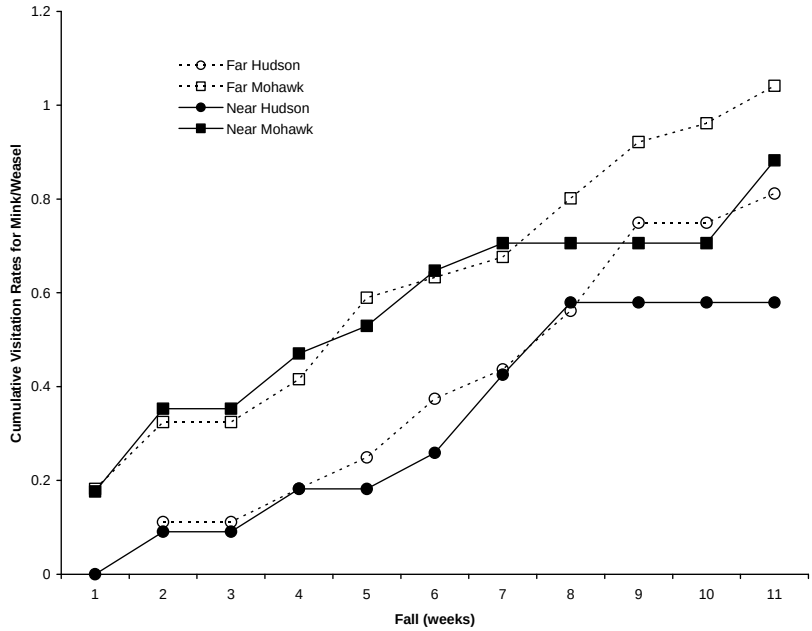


Figure 16. Graphs of cumulative visitation rates for mink within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates and included dates when mink were observed at stations. Visits for mink include visits documented from tracks that were identified initially as possibly made by long-tailed weasels.



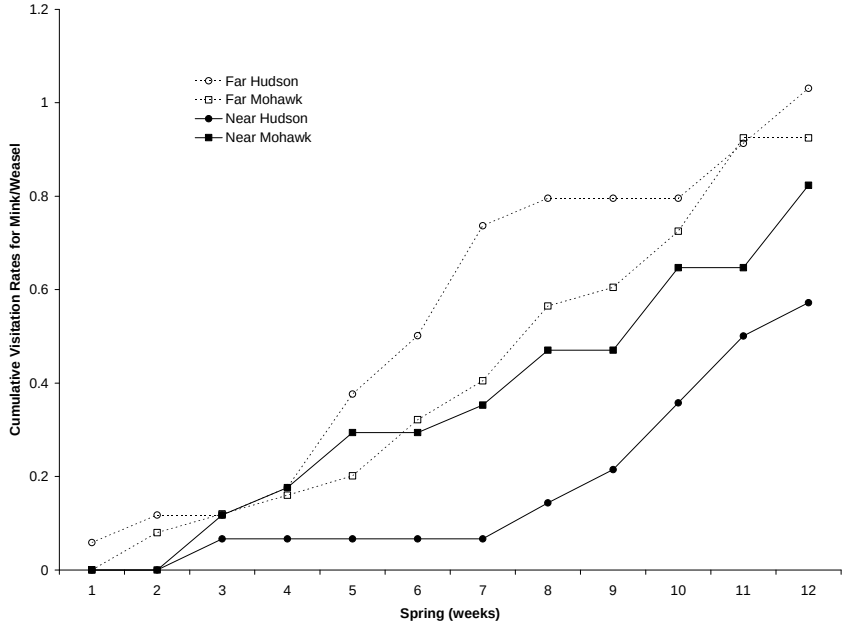


Figure 17. Graphs of cumulative visitation rates for mink within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates and included dates when mink were observed at stations or mink tracks were observed in mud or snow near stations. Visits for mink include visits documented from tracks that were identified initially as possibly made by long-tailed weasels.

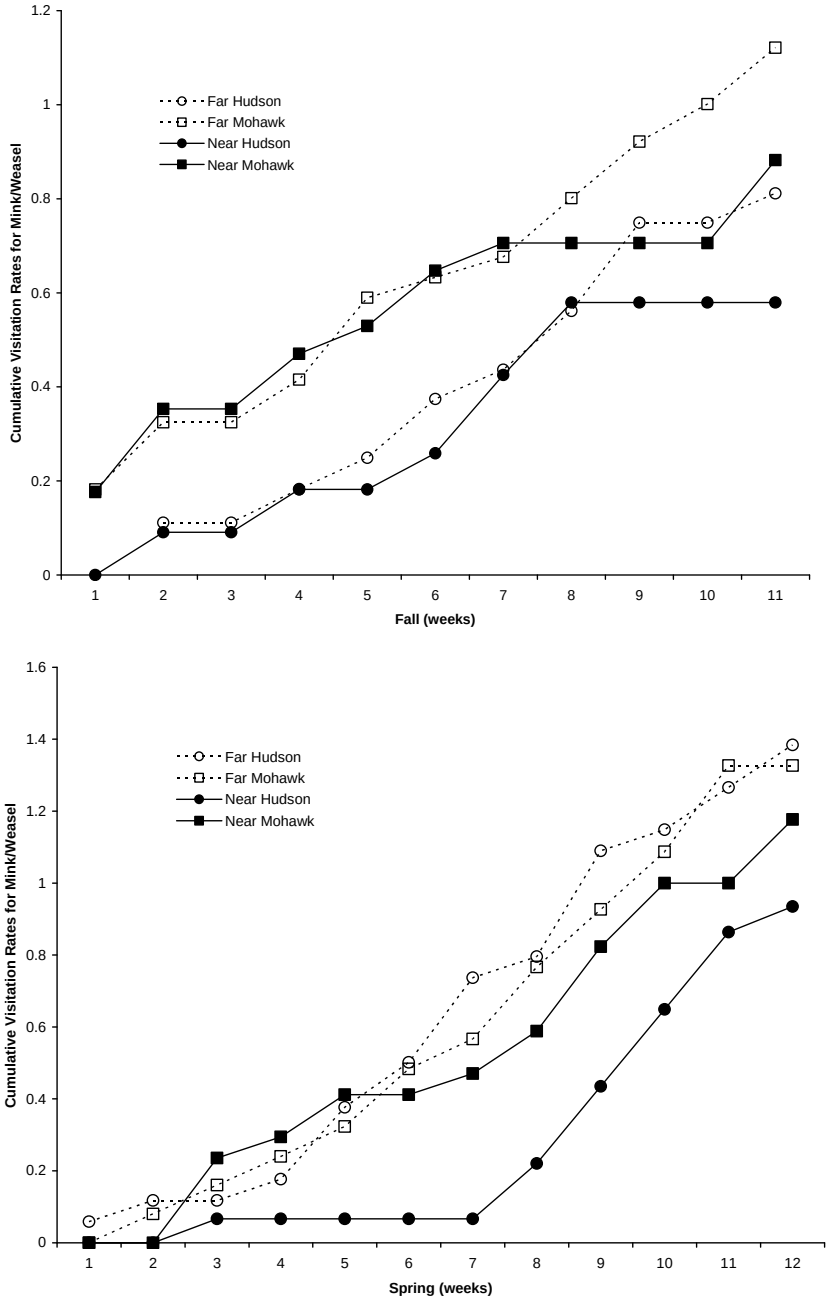


Figure 18. Graphs of cumulative visitation rates for ermine within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates. Visits for ermine do not include visits documented from tracks that were identified initially as possibly made by long-tailed weasels.

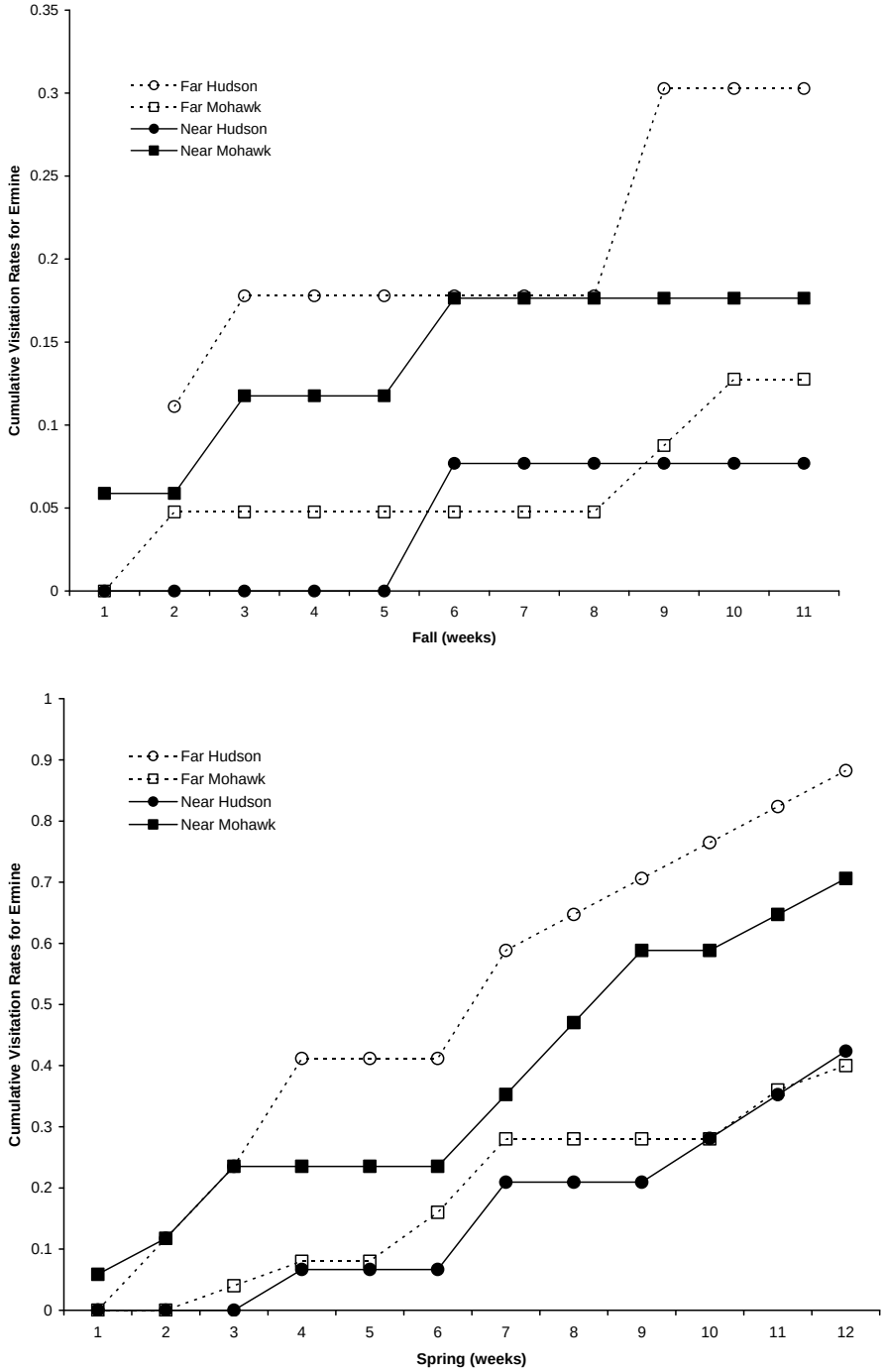
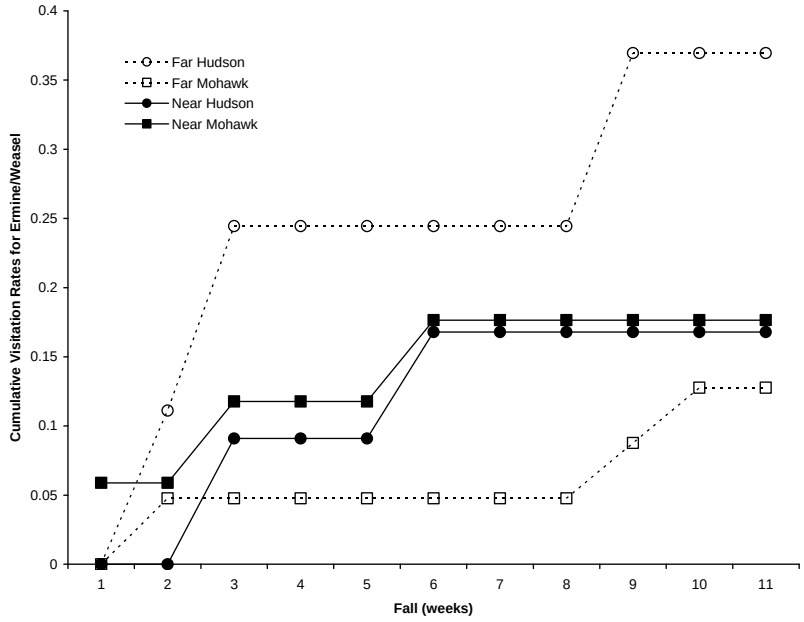


Figure 19. Graphs of cumulative visitation rates for ermine within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates. Visits for ermine include visits documented from tracks that were identified initially as possibly made by long-tailed weasels.



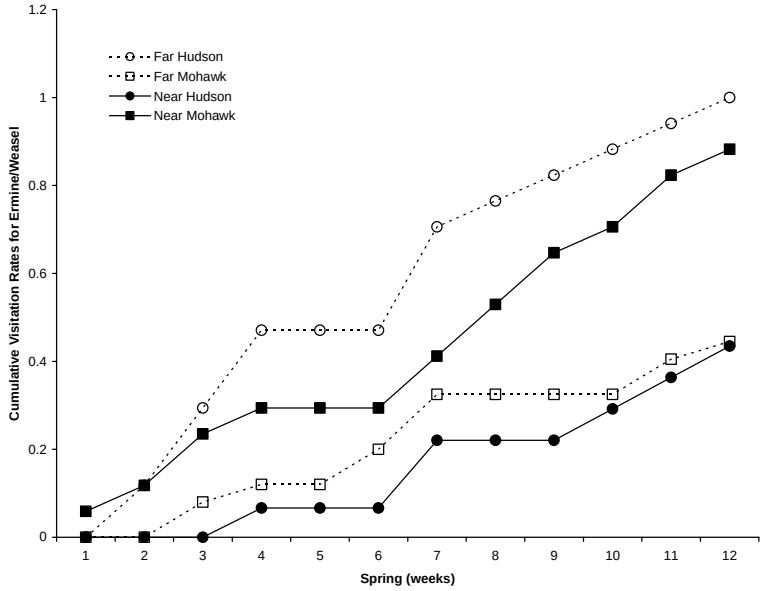
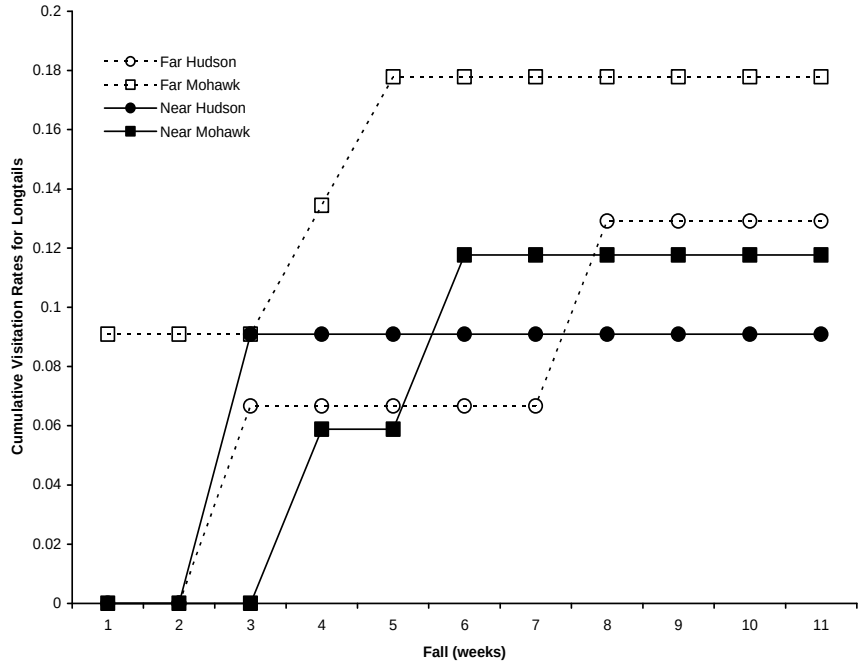


Figure 20. Graphs of cumulative visitation rates for possible long-tailed weasels within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.



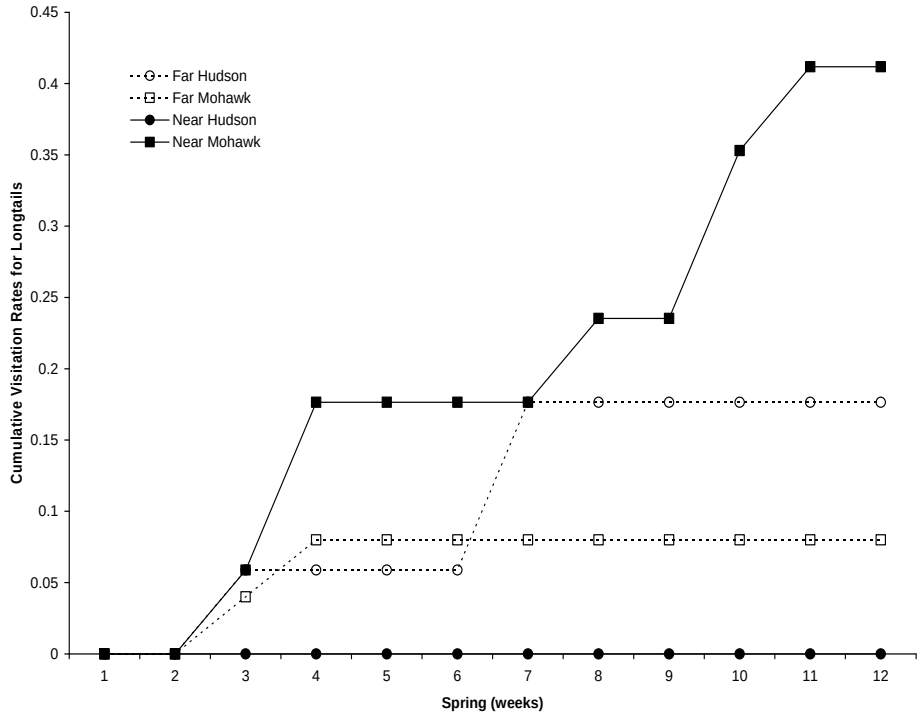
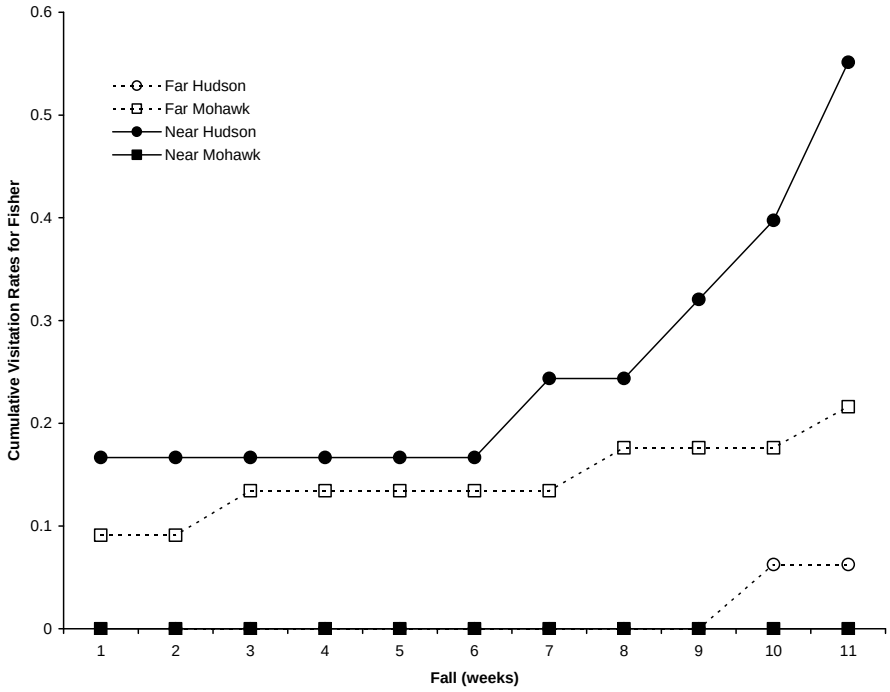


Figure 21. Graphs of cumulative visitation rates for fisher within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.



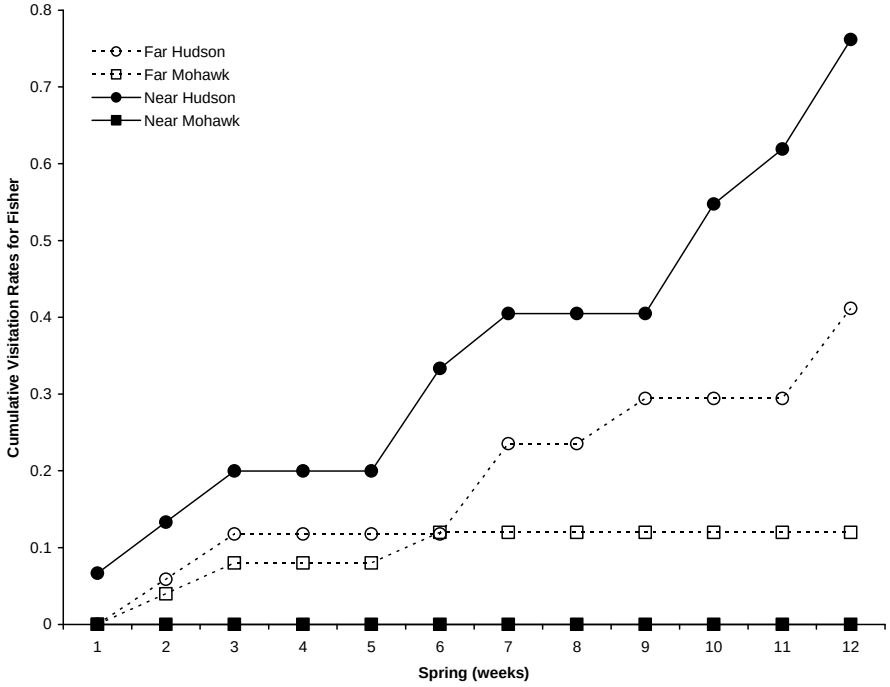


Figure 22. Graphs of cumulative visitation rates for Eastern chipmunk within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

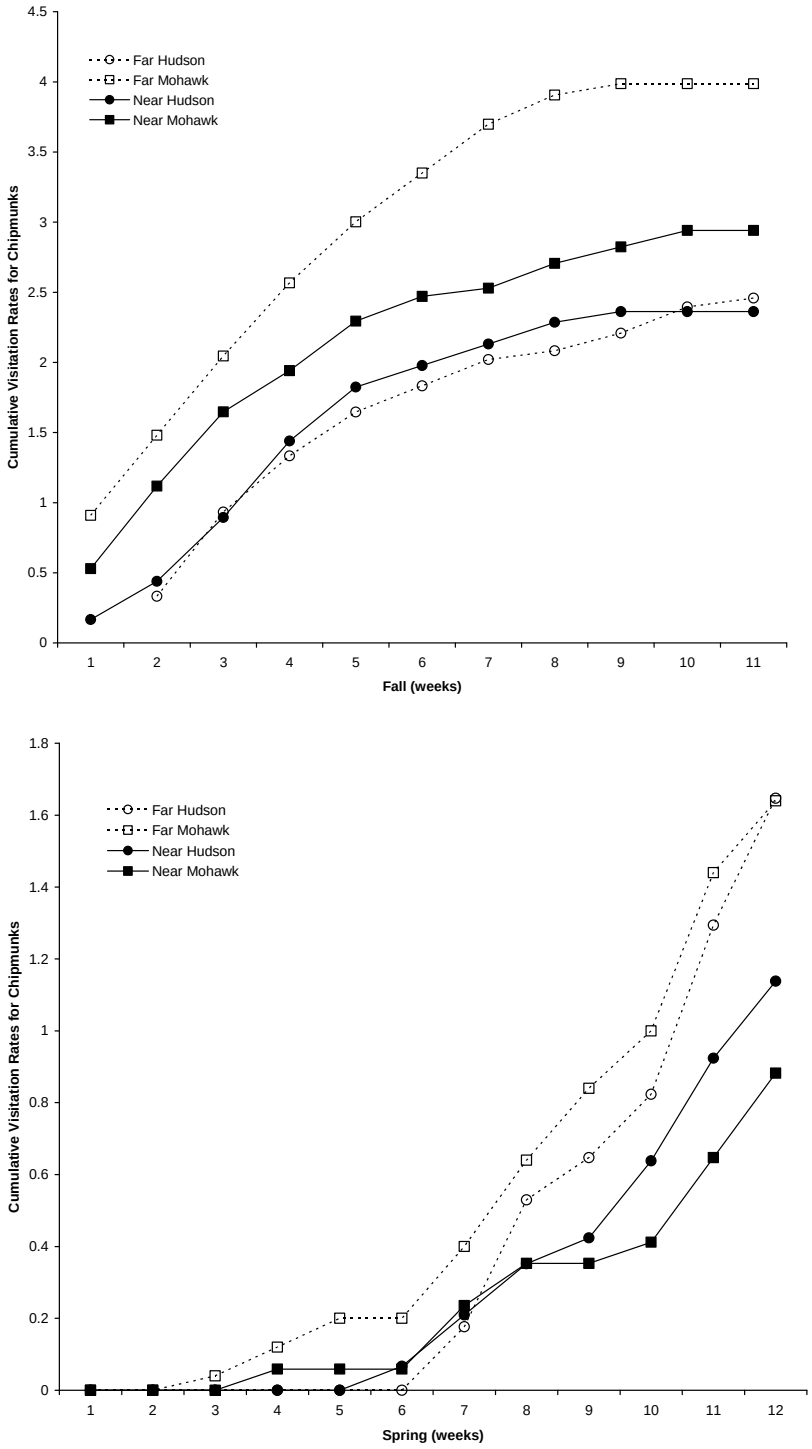
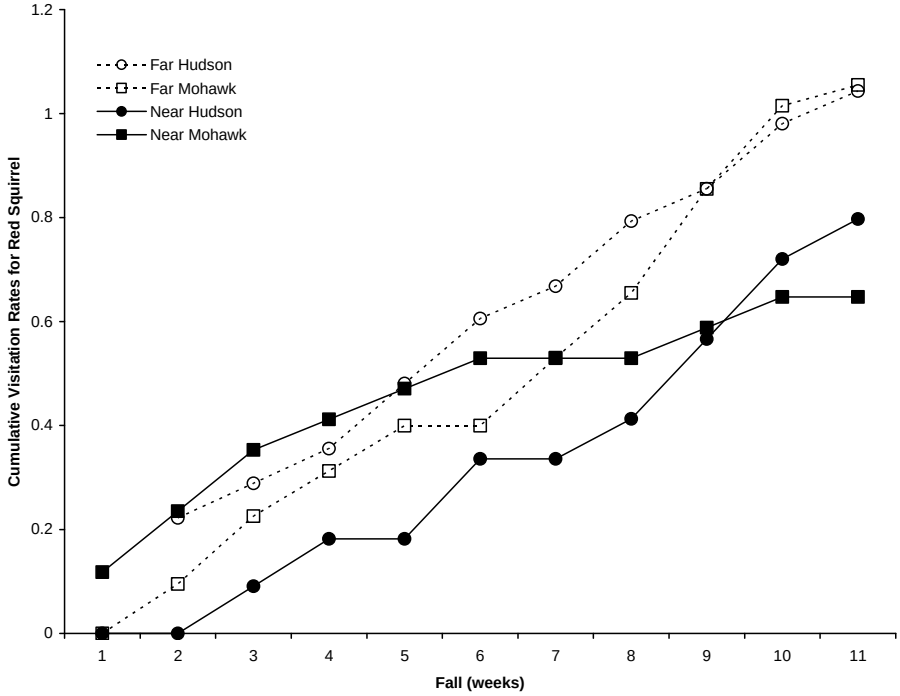


Figure 23. Graphs of cumulative visitation rates for red squirrel within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.



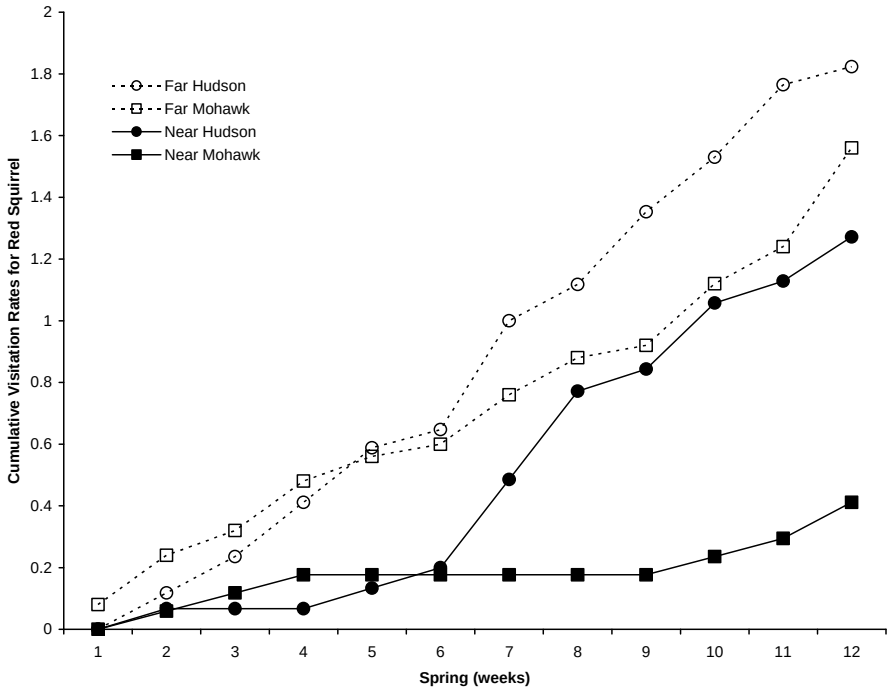


Figure 24. Graphs of cumulative visitation rates for Eastern gray squirrel within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

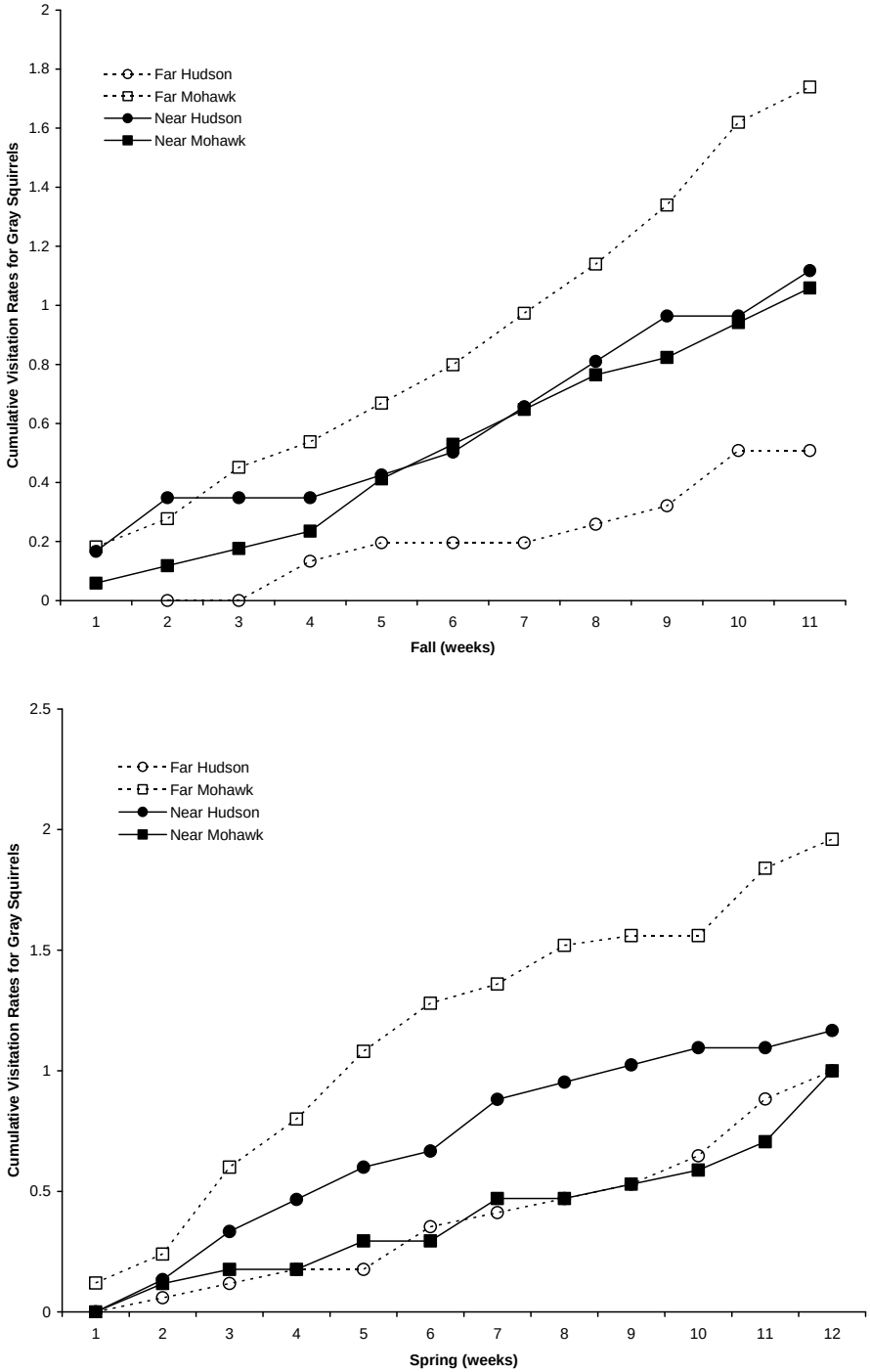
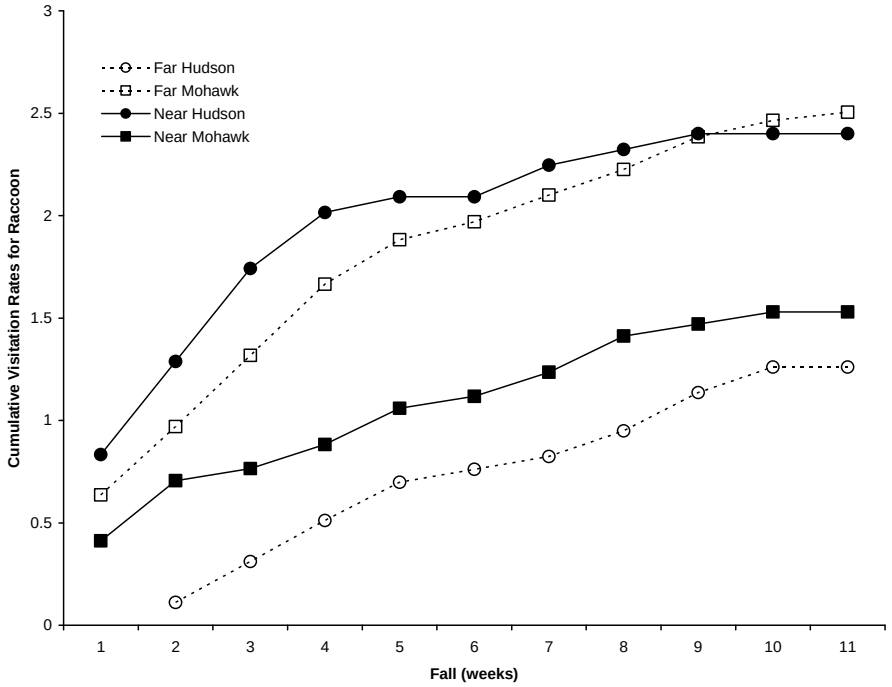


Figure 25. Graphs of cumulative visitation rates for raccoon within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.



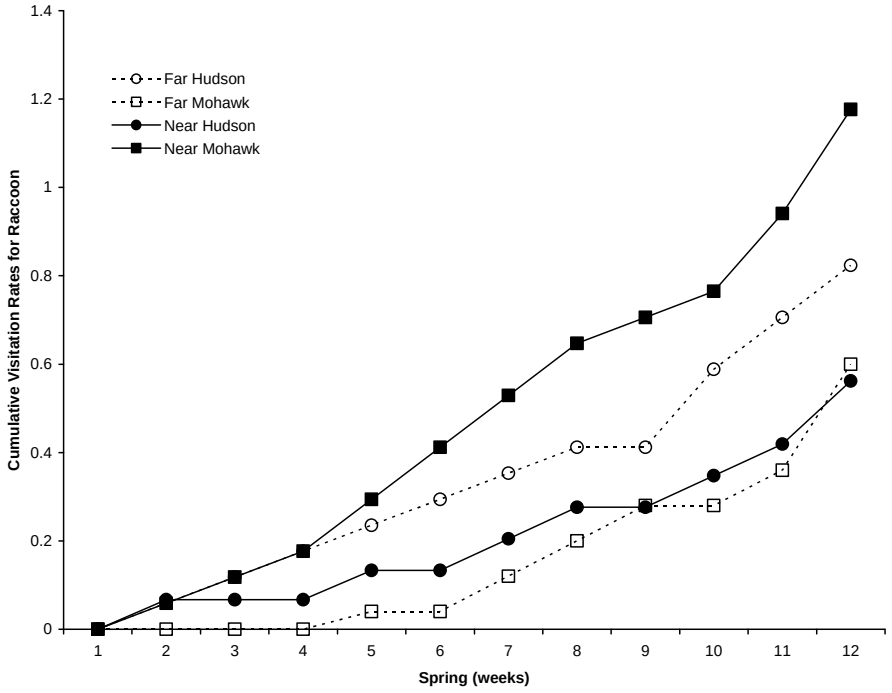
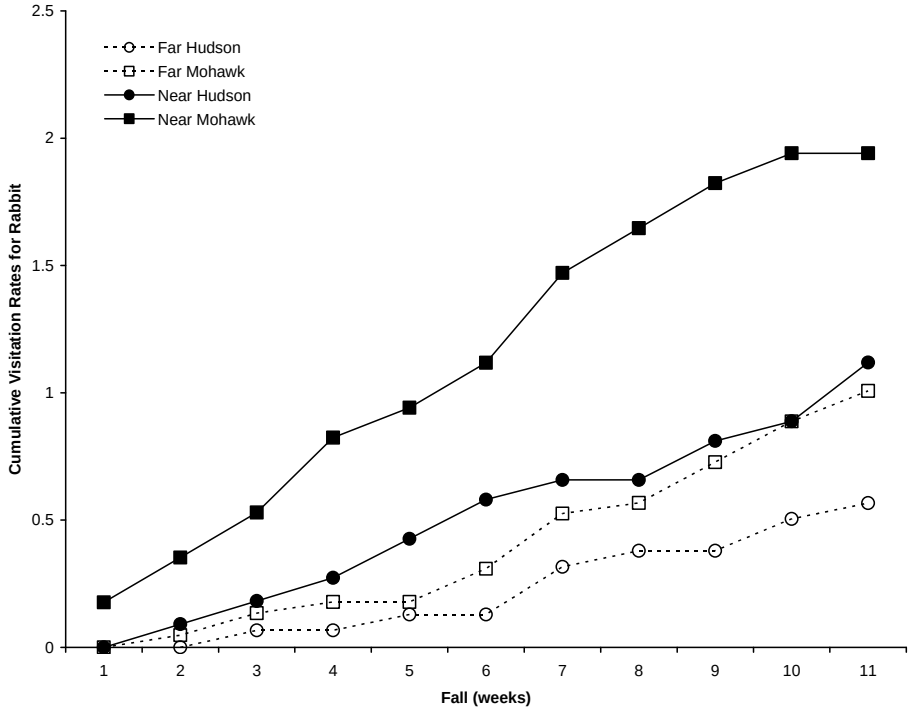


Figure 26. Graphs of cumulative visitation rates for rabbit within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.



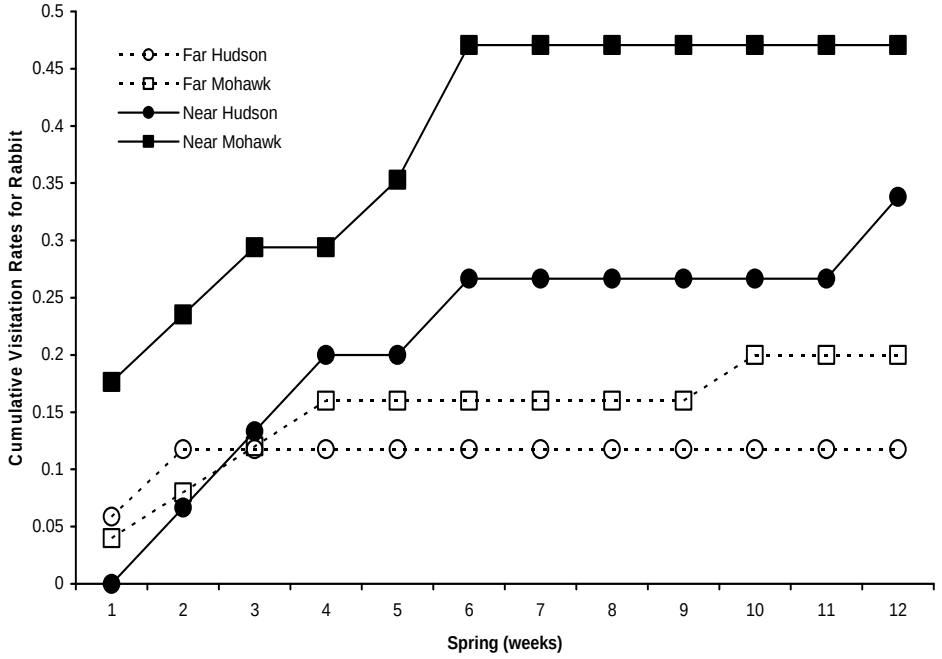


Figure 27. Graphs of cumulative visitation rates for feral cat within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

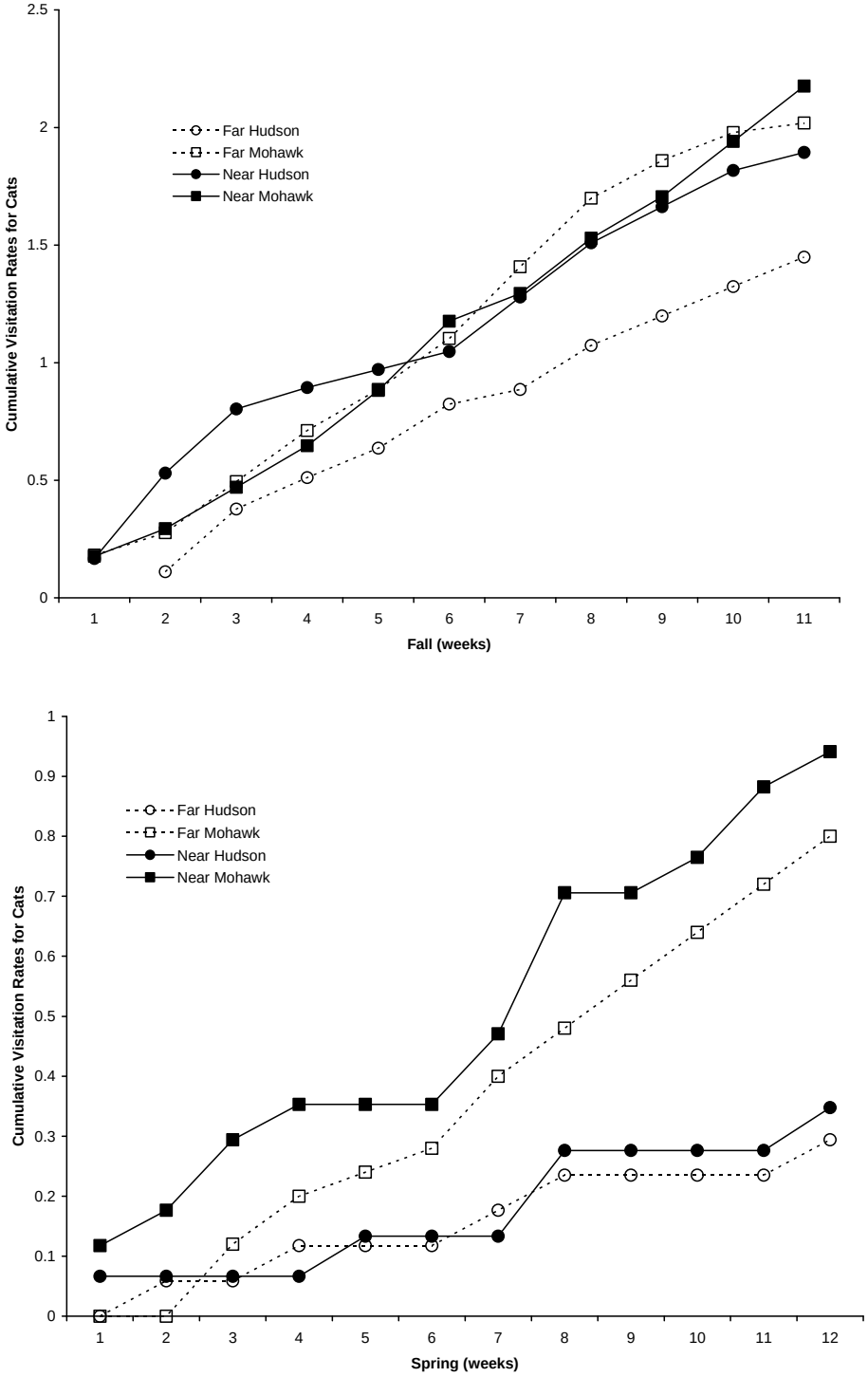


Figure 28. Graphs of cumulative visitation rates for striped skunk within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

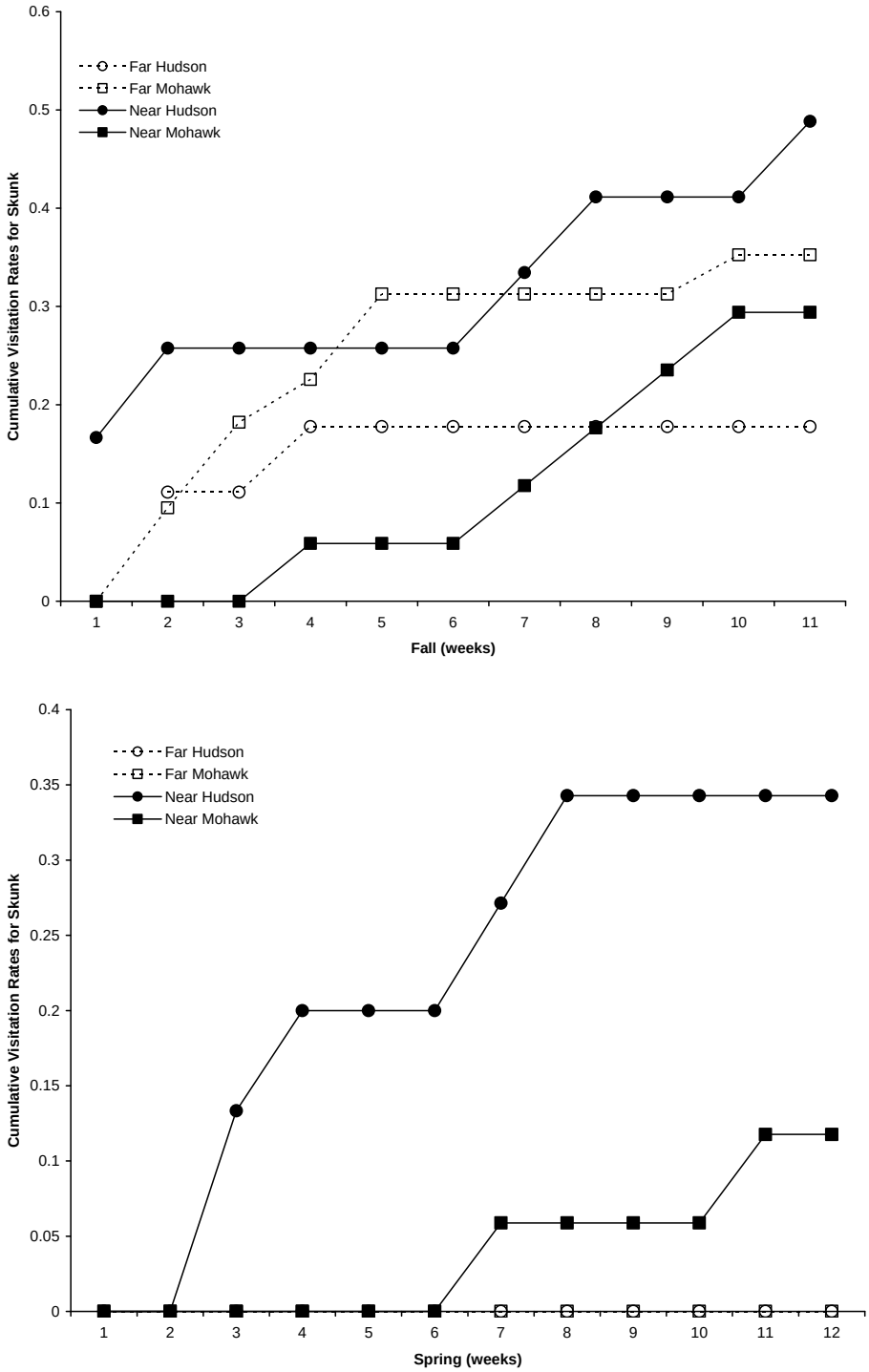


Figure 29. Graphs of cumulative visitation rates for Virginia opossum within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.

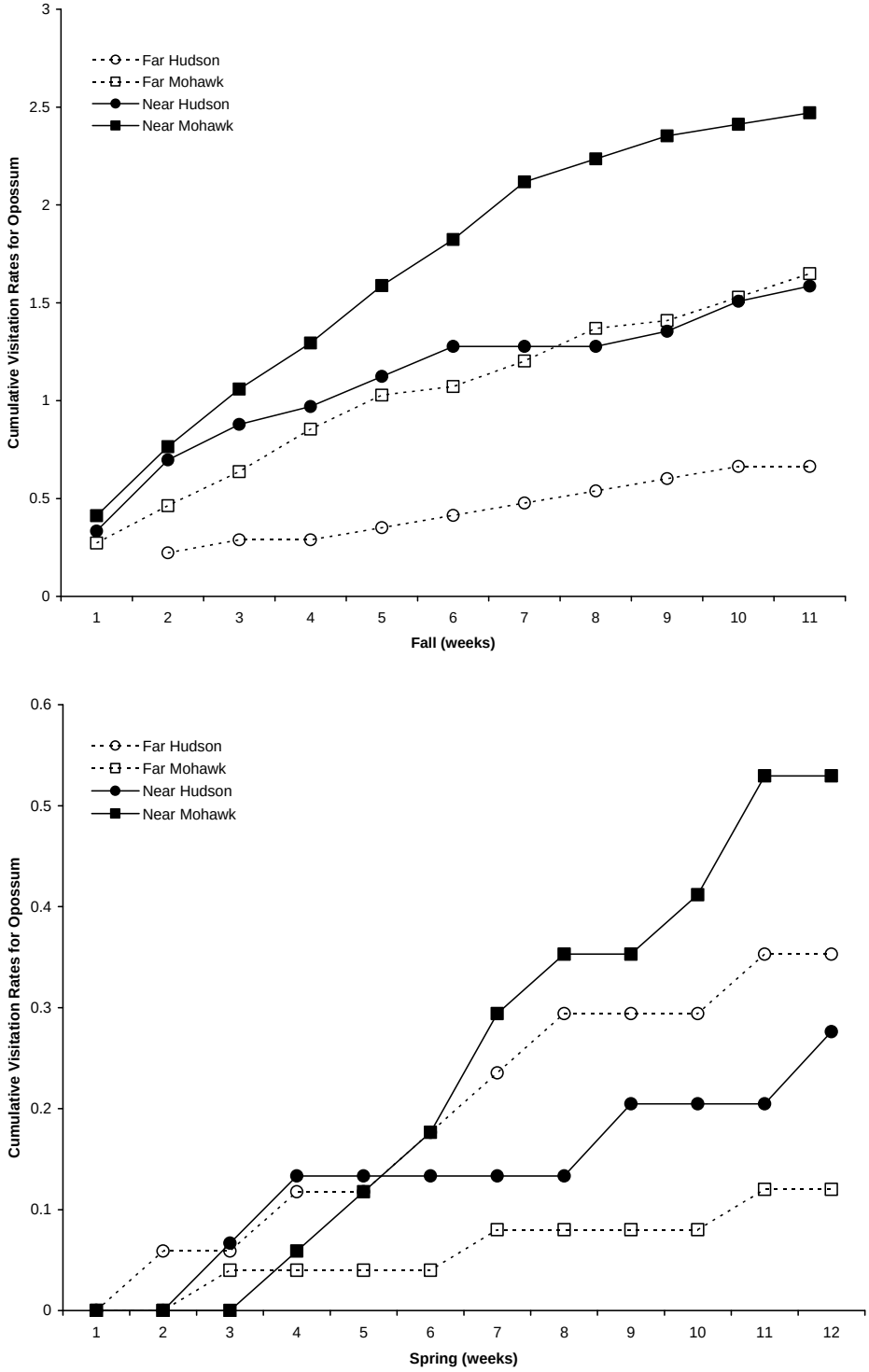
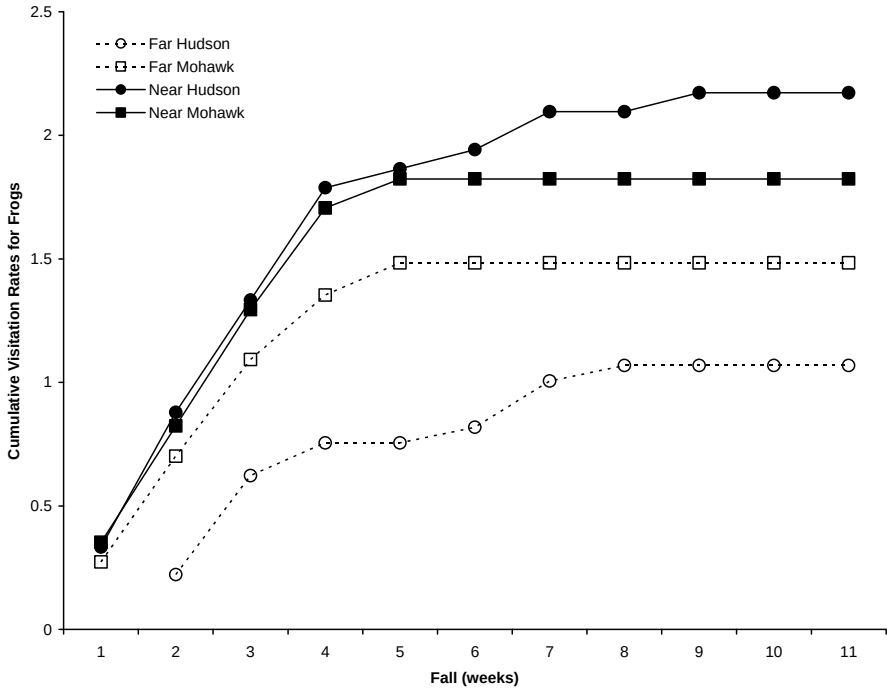


Figure 30. Graphs of cumulative visitation rates for frogs and salamanders within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) monitoring period. Visits to scent stations were documented from tracks recorded on track plates.



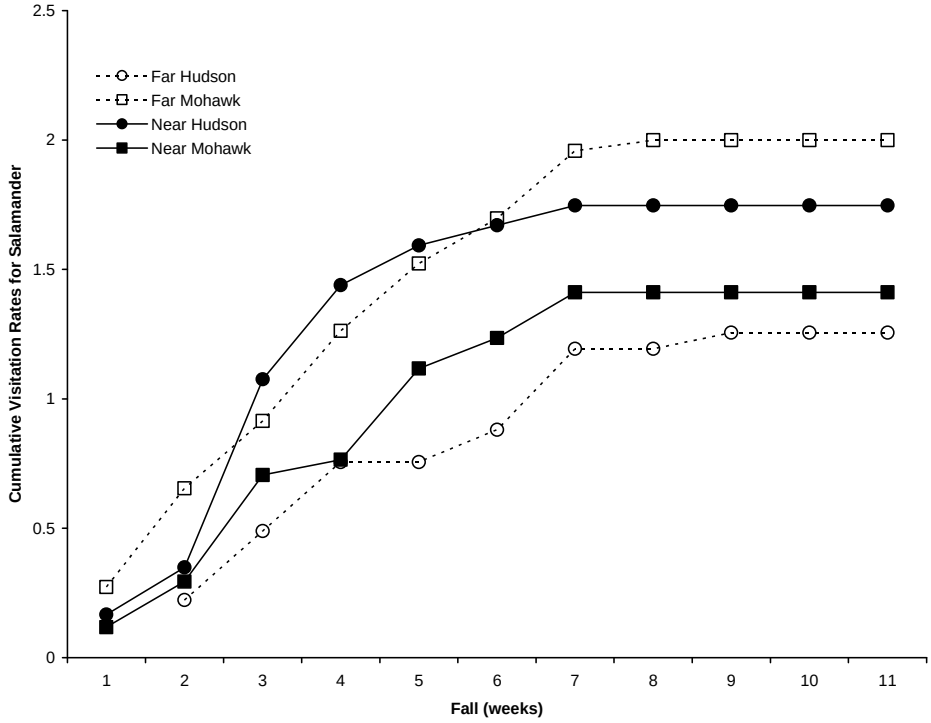
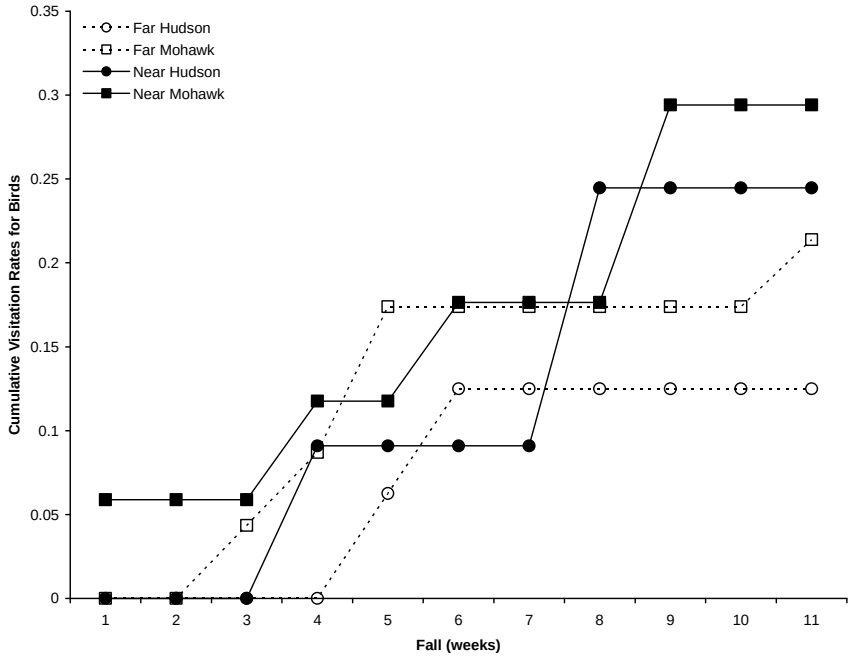
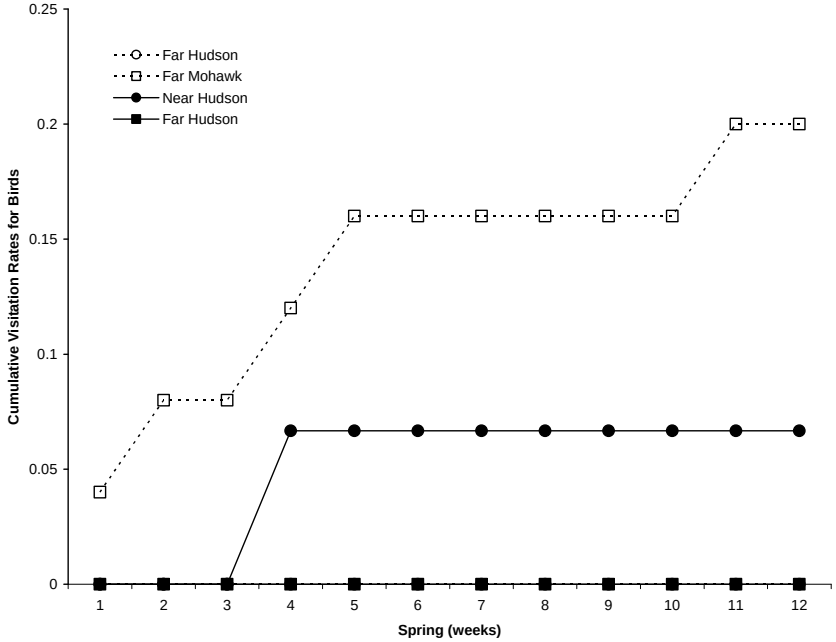


Figure 31. Graphs of cumulative visitation rates for birds within locational categories (far-Hudson, far-Mohawk, near-Hudson, near-Mohawk) of the Hudson and Mohawk drainages during fall (10/03/00 to 12/12/00) and spring (1/9/01 to 3/27/01) monitoring periods. Visits to scent stations were documented from tracks recorded on track plates.





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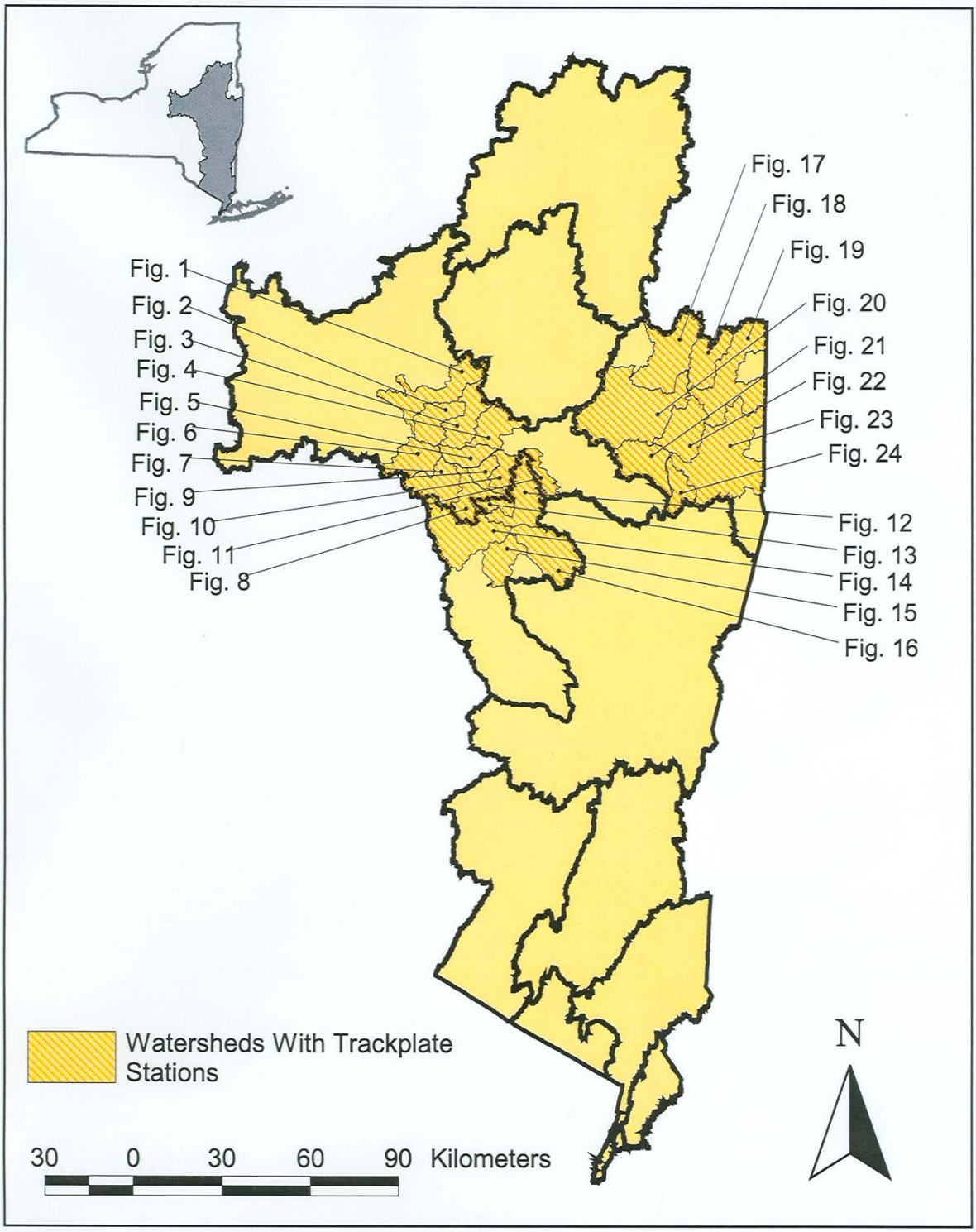
Appendix I

Scent-station locations within the Hudson River and Mohawk River drainages, 2000/2001. Maps were created using ArcView GIS 3.2 (Environmental Systems Research Institute, 1996). Map images were obtained from the Master Habitat Data Bank (New York State Department of Environmental Conservation., 2003).



Index to figures of trackplate station locations within NYS 11 digit HUC watershed boundaries. Eleven digit HUC watershed boundaries (thin outline) are shown within eight digit HUC watershed (bold outline).

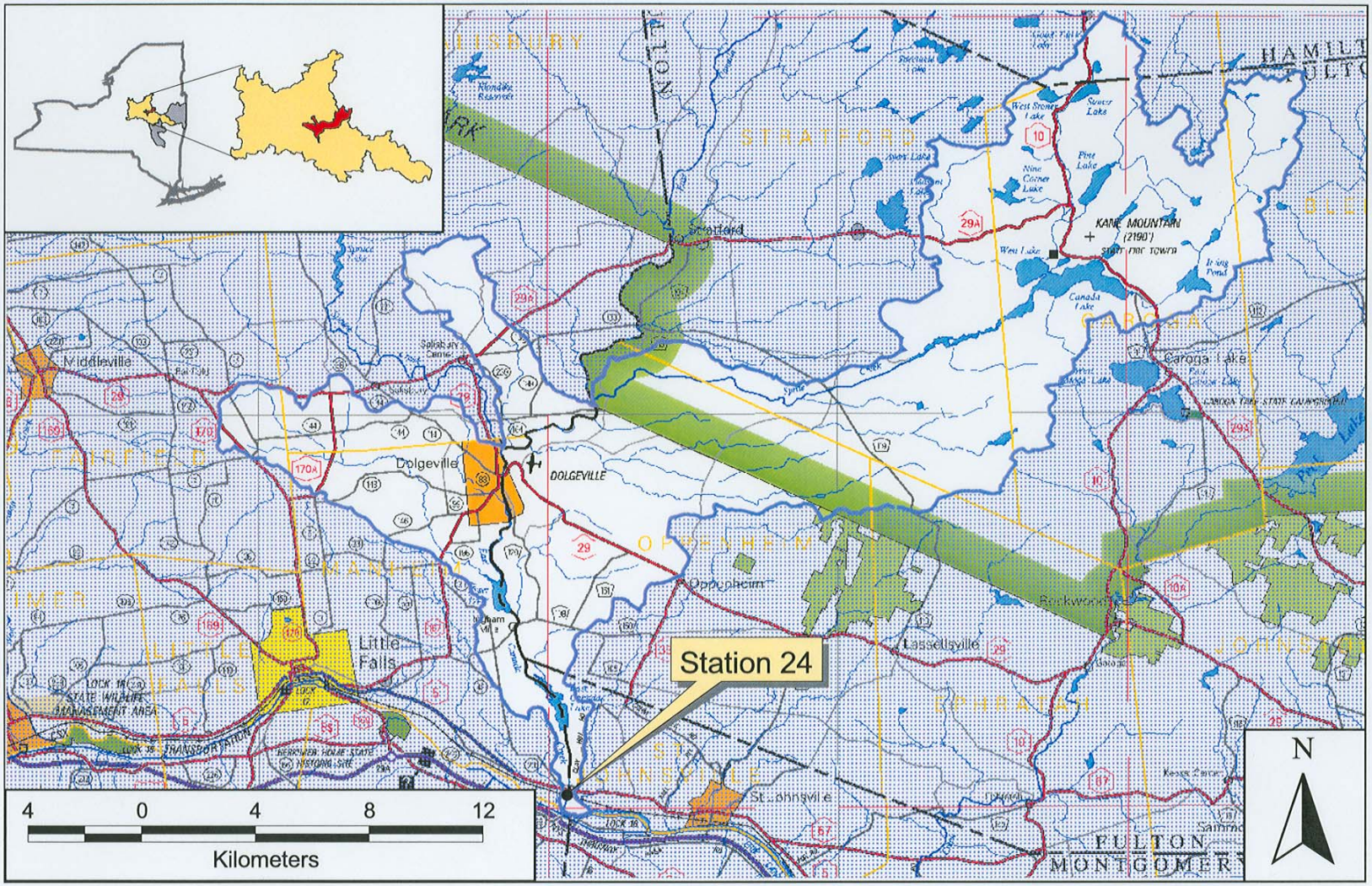


Figure 1. Trackplate station locations in the Lower East Canada Creek Watershed (NYS 11 digit HUC).

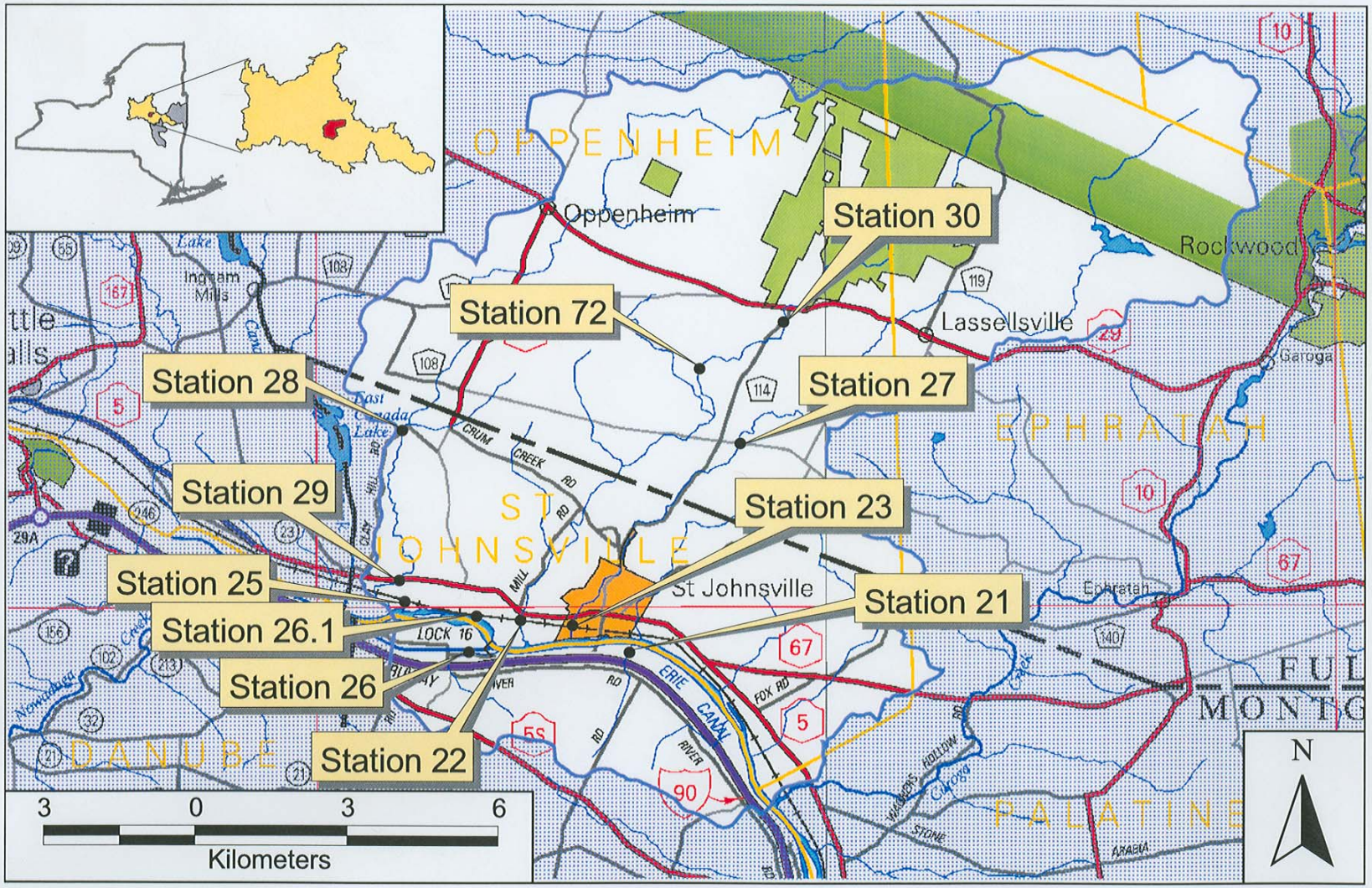


Figure 2. Trackplate station locations in the East Canada Creek to Caroga Creek Watershed (NYS 11 digit HUC).

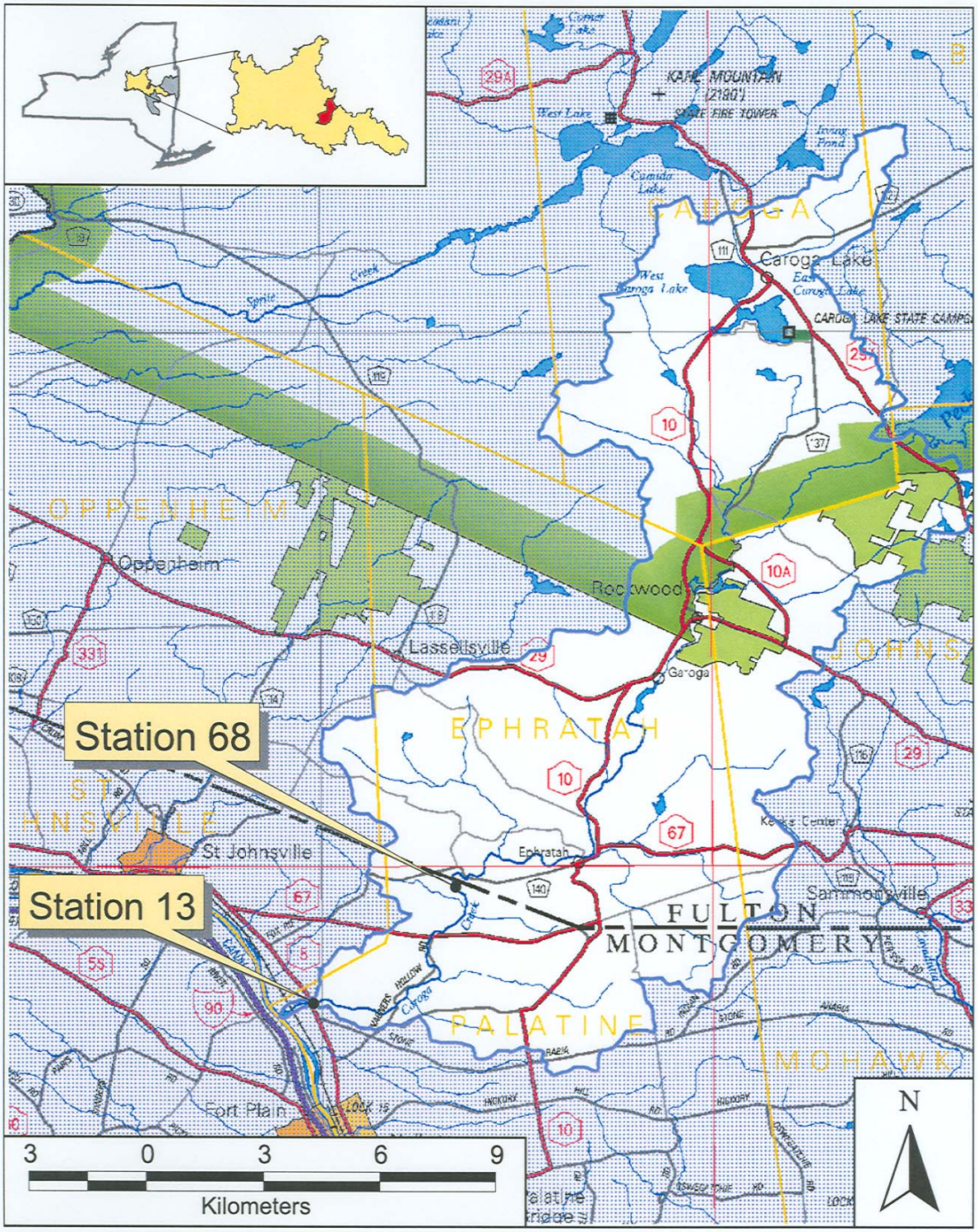


Figure 3. Trackplate station locations in the Caroga Creek Watershed (NYS 11 digit HUC).

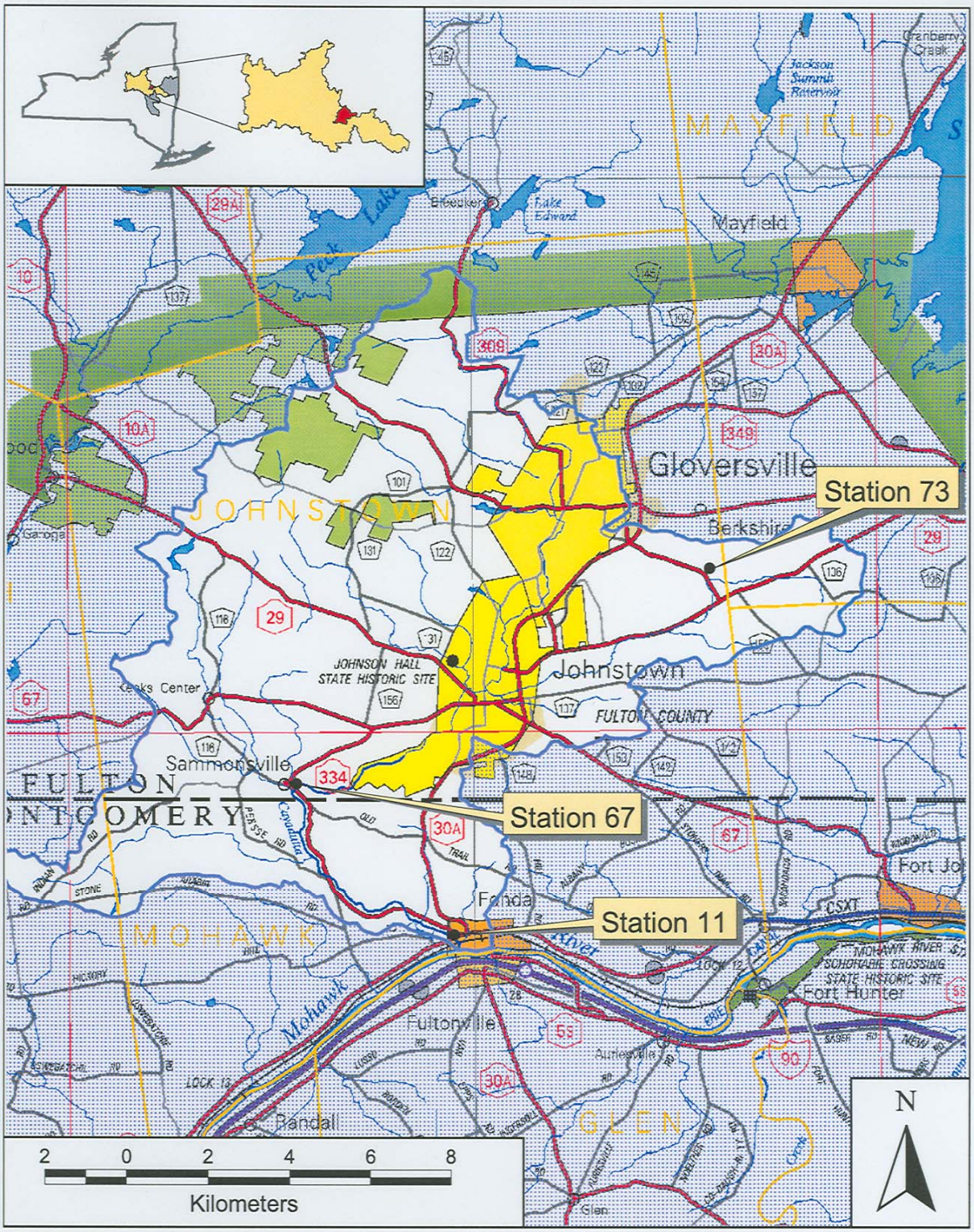


Figure 4. Trackplate station locations in the Cayadutta Creek Watershed (NYS 11 digit HUC).

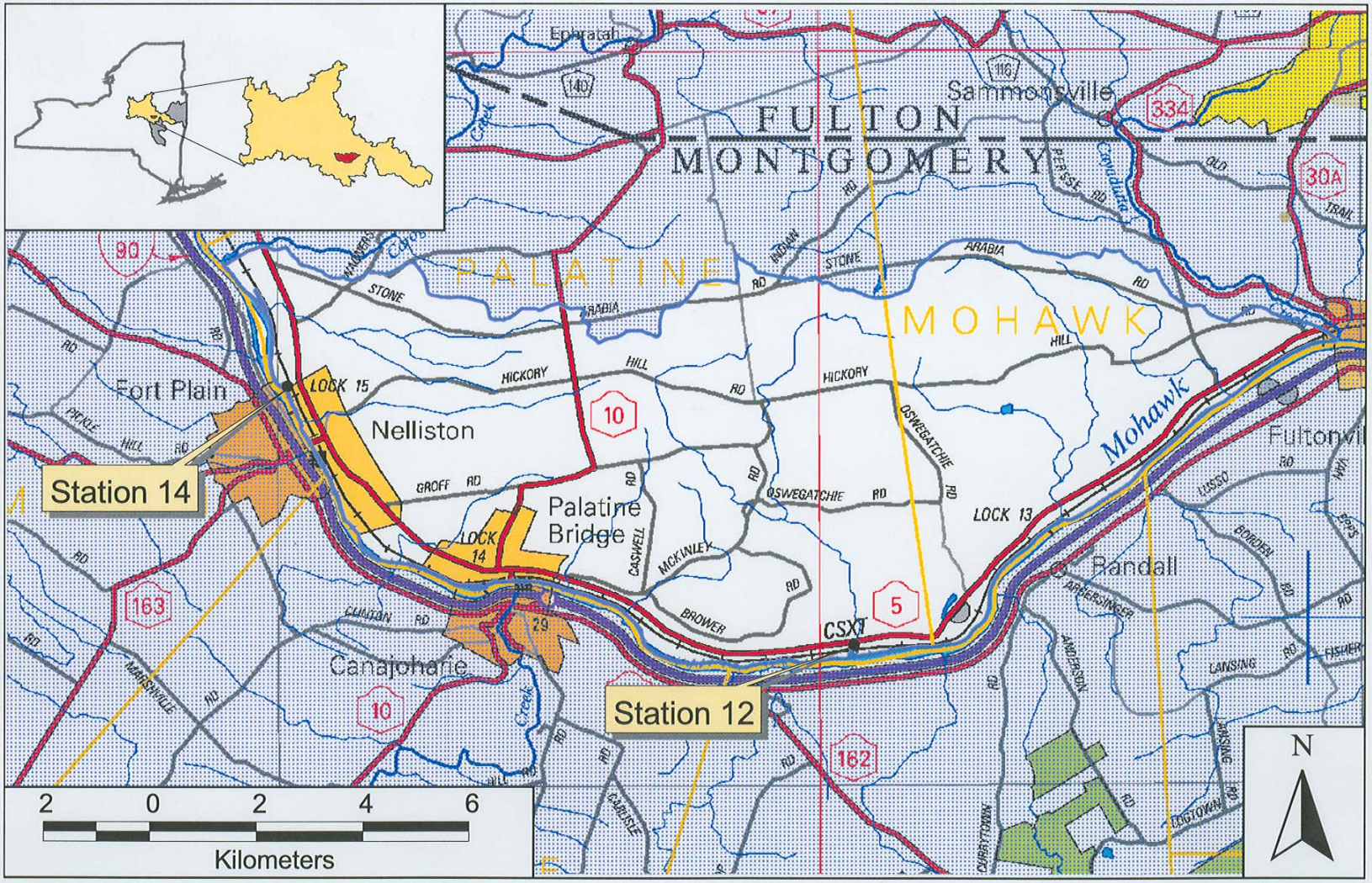


Figure 5. Trackplate station locations in the Caroga Creek to Cayadutta Creek Watershed (NYS 11 digit HUC).

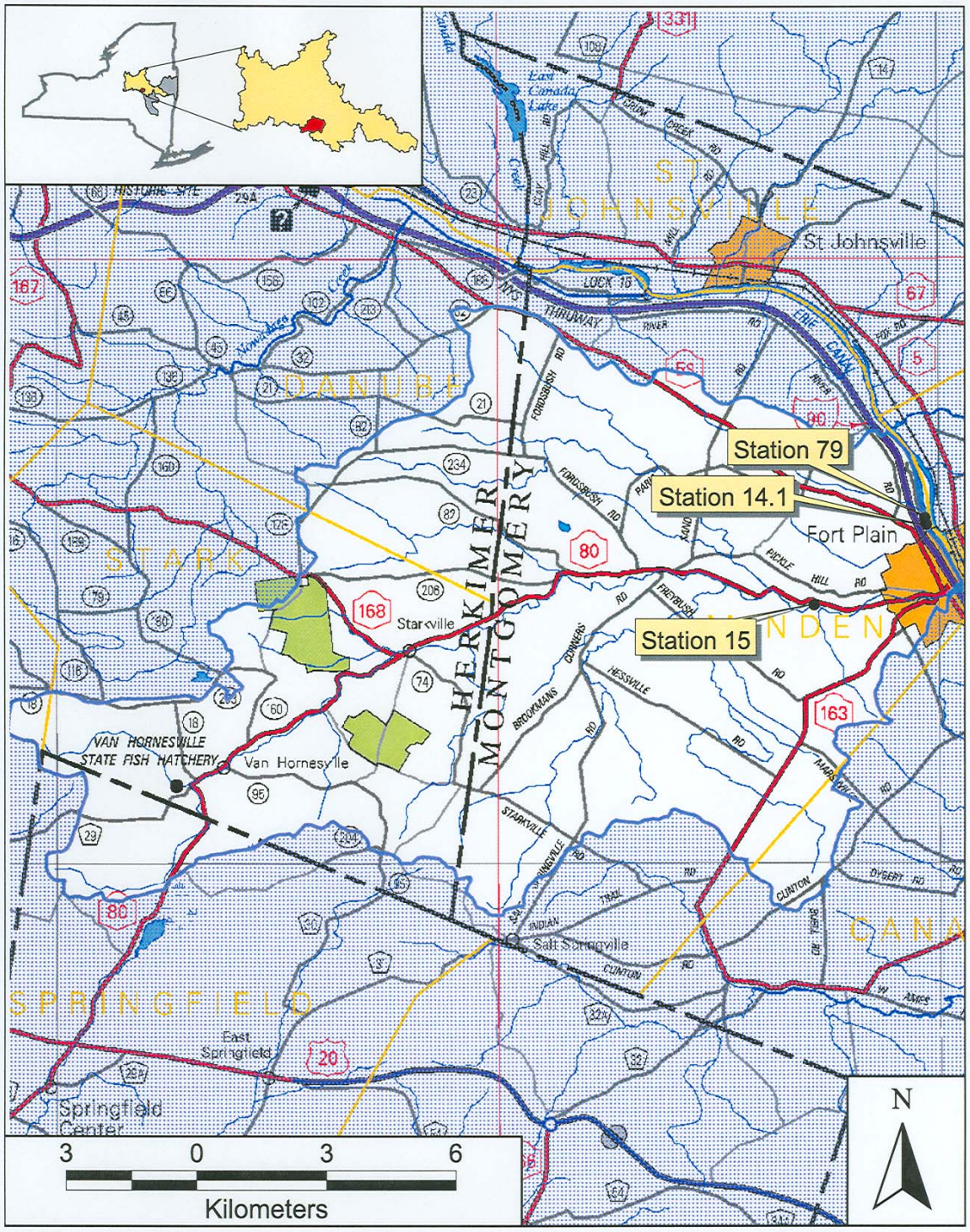


Figure 6. Trackplate station locations in the Otsguaga Creek Watershed (NYS 11 digit HUC).

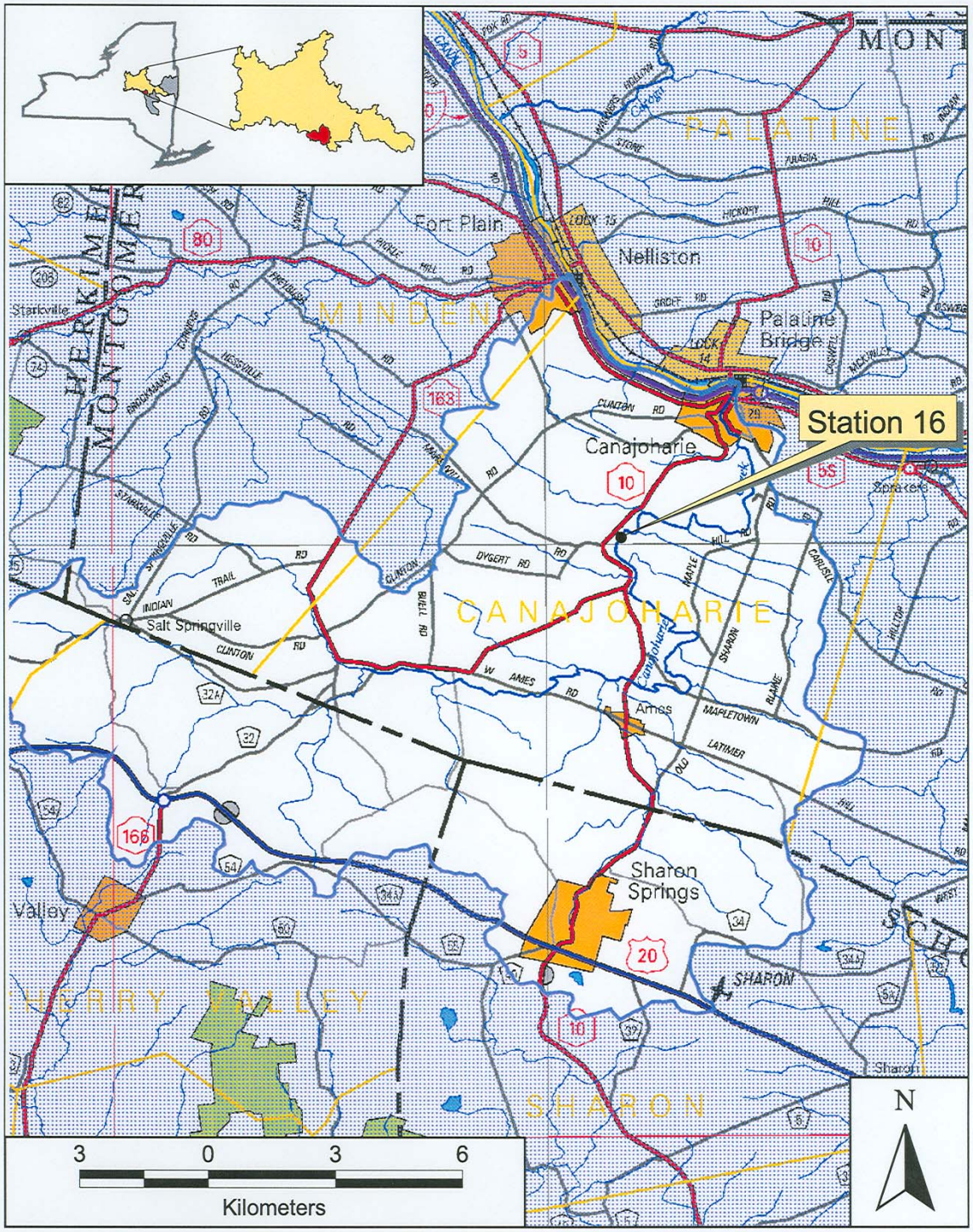


Figure 7. Trackplate station locations in the Otsguago Creek to Canajoharie Creek Watershed (NYS 11 digit HUC).

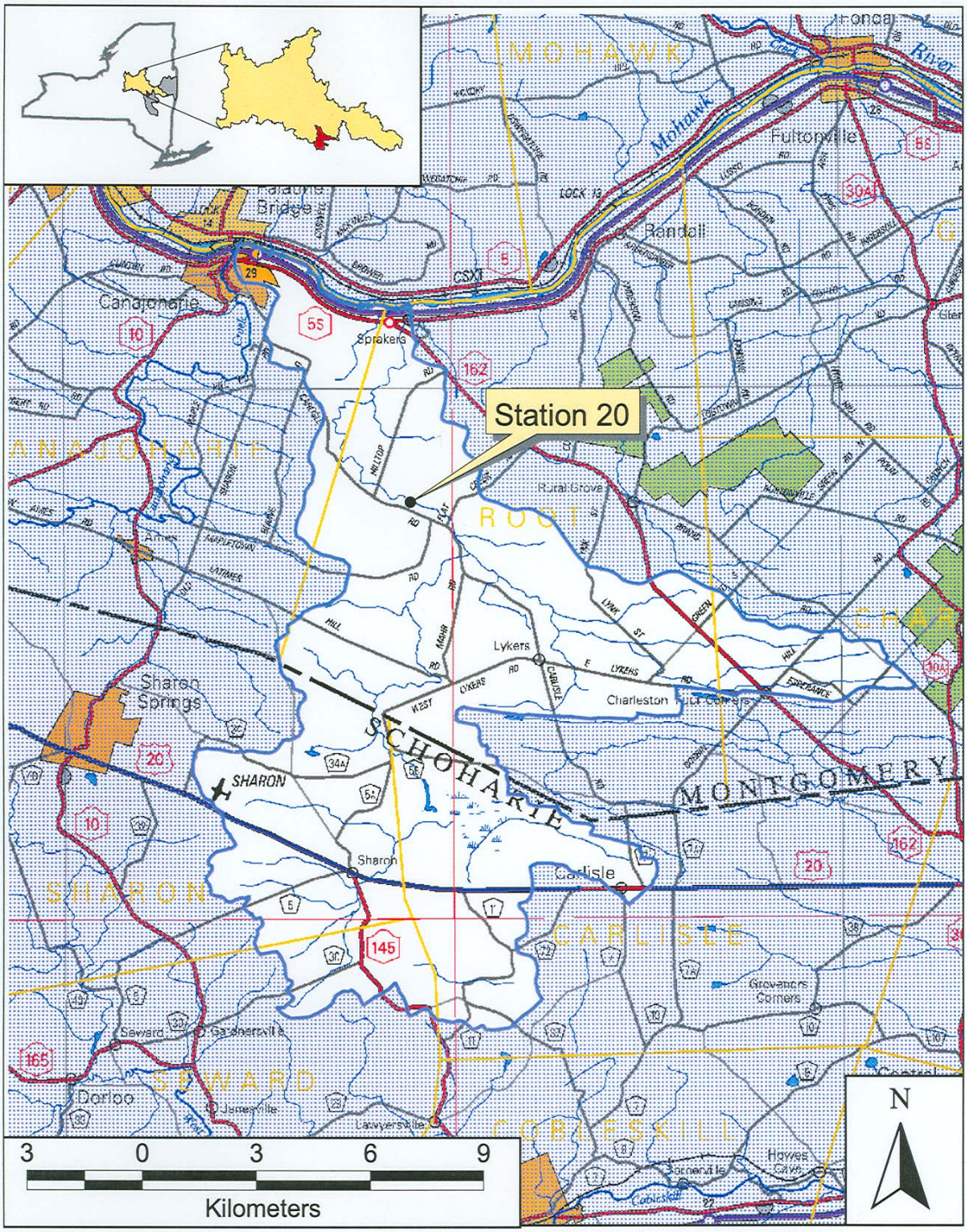


Figure 8. Trackplate station locations in the Canajoharie Creek to Flat Creek Watershed (NYS 11 digit HUC).

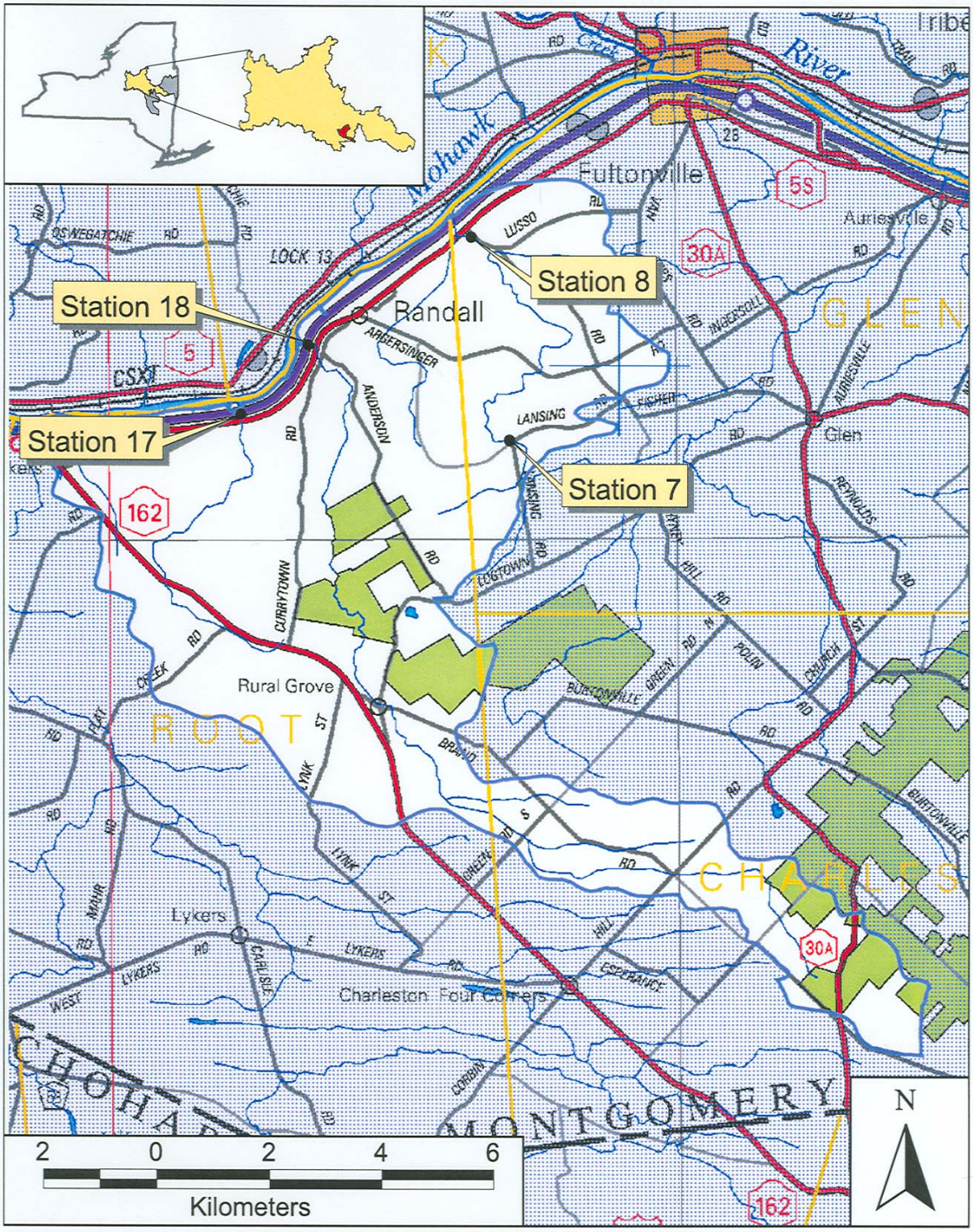


Figure 9. Trackplate station locations in the Flat Creek to Van Wie Creek Watershed (NYS 11 digit HUC).

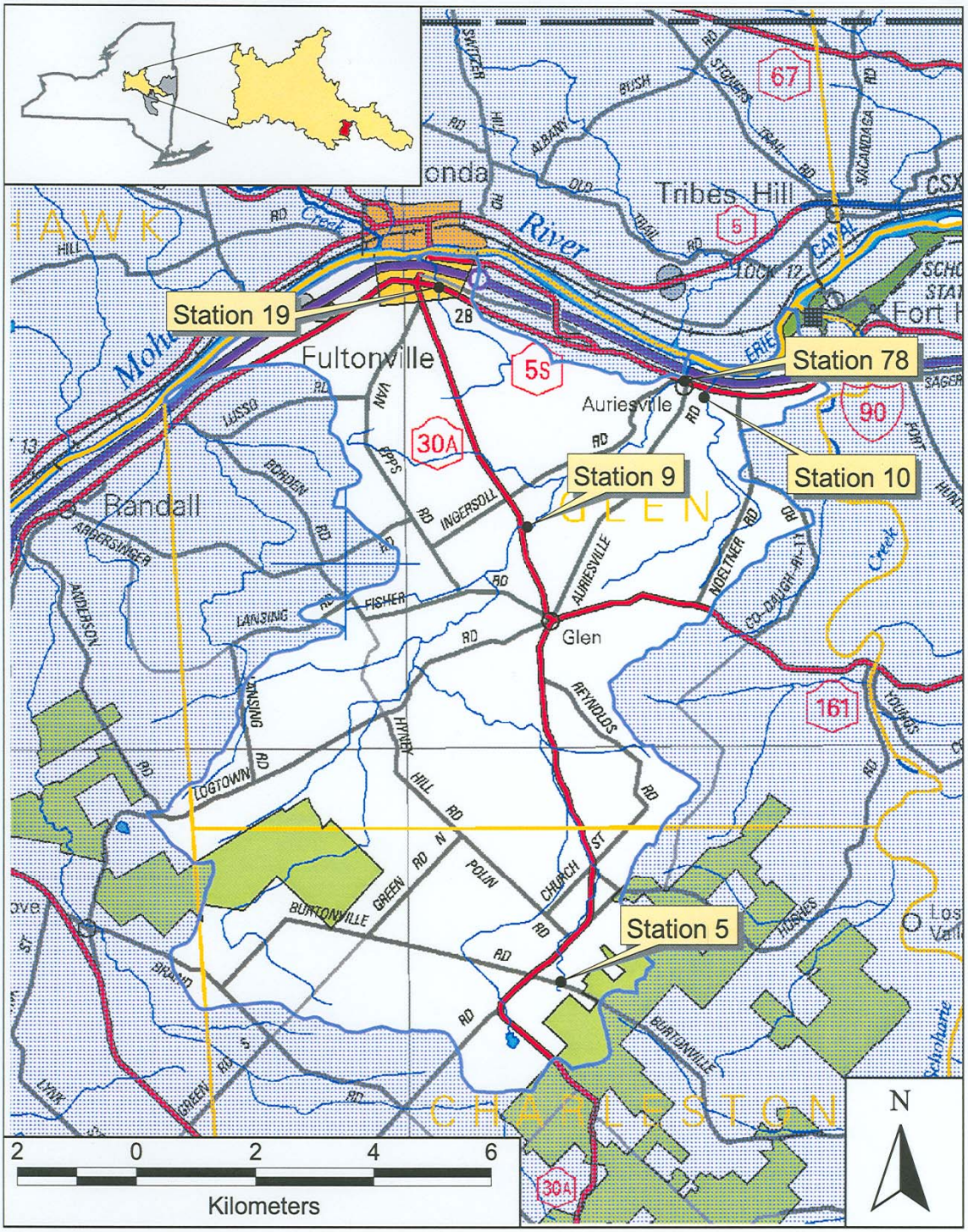


Figure 10. Trackplate station locations in the Van Wie Creek to Schoharie Creek Watershed (HUC 11 digit HUC).

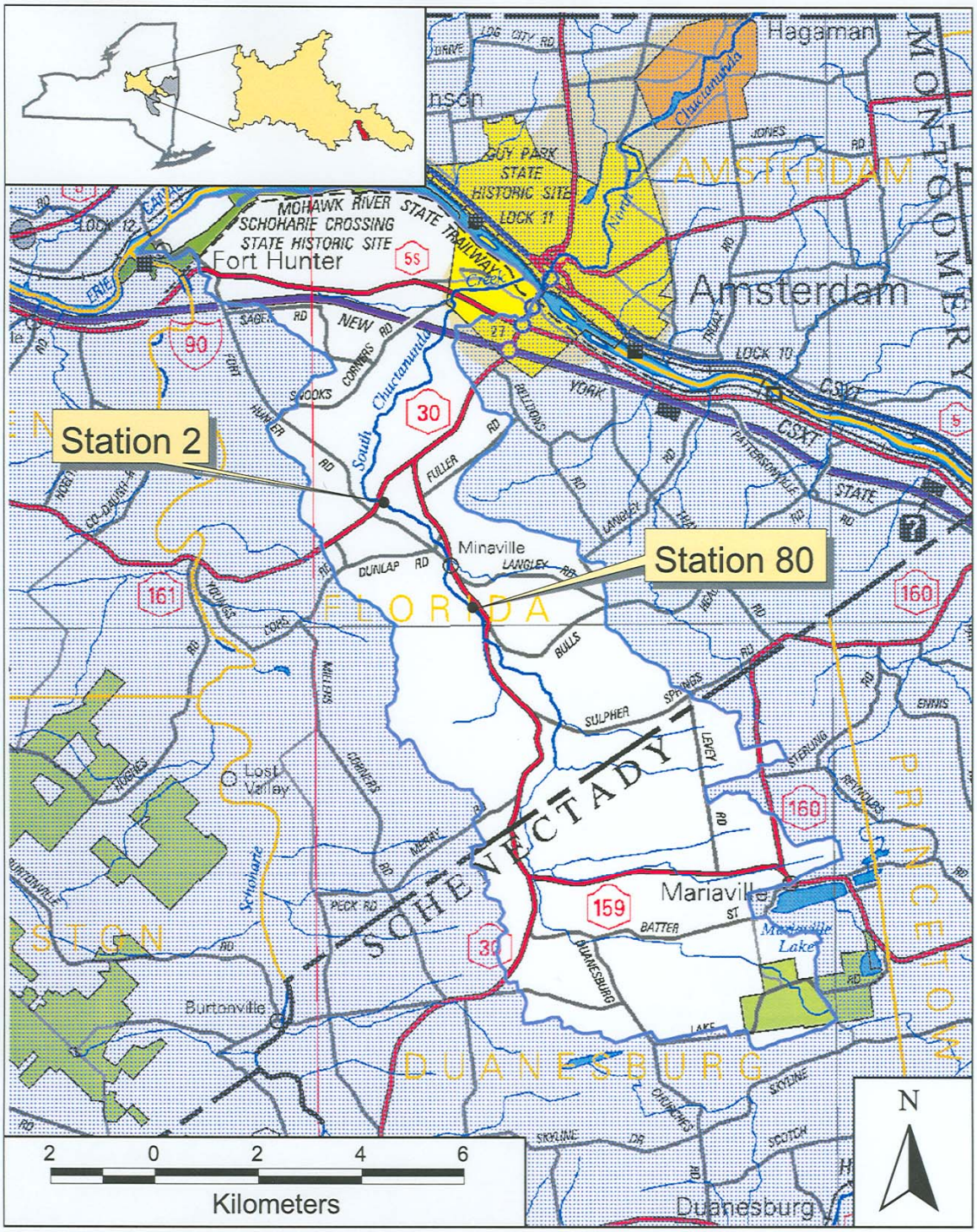


Figure 11. Trackplate station locations in the South Chuctanunda Creek Watershed (NYS 11 digit HUC).

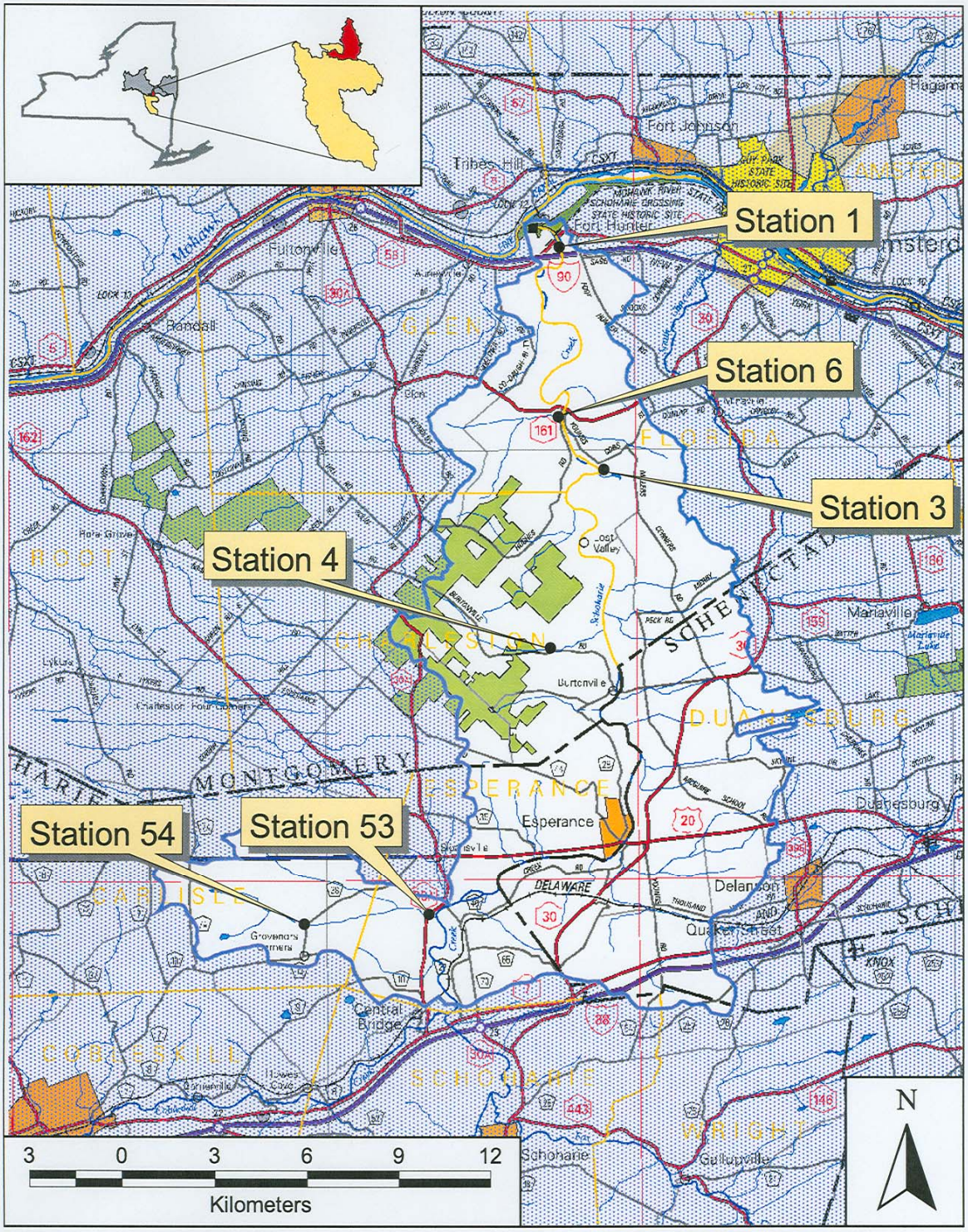


Figure 12. Trackplate station locations in the Lower Schoharie Creek Watershed (NYS 11 digit HUC).

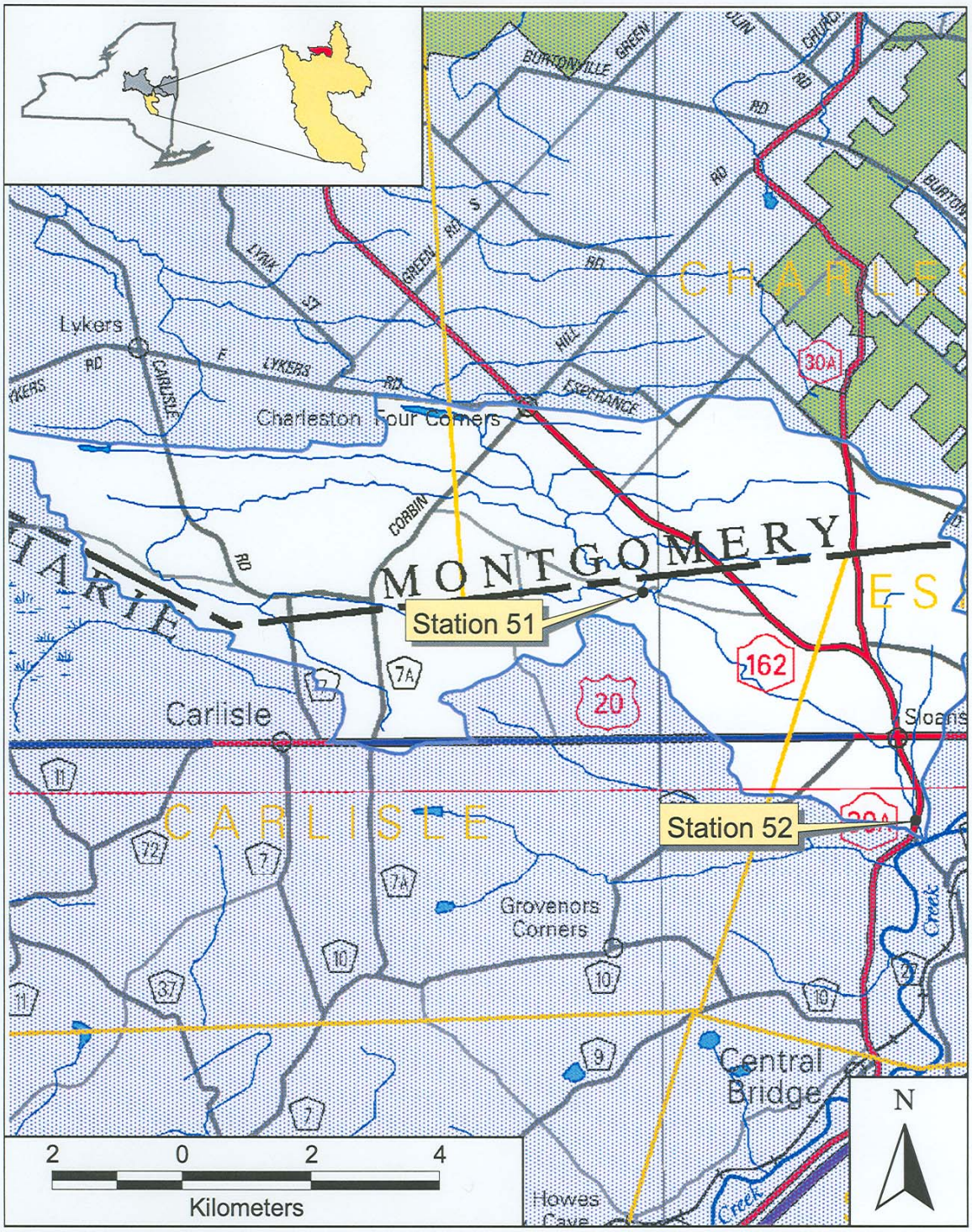


Figure 13. Trackplate station locations in the Fly Creek Watershed (NYS 11 digit HUC).

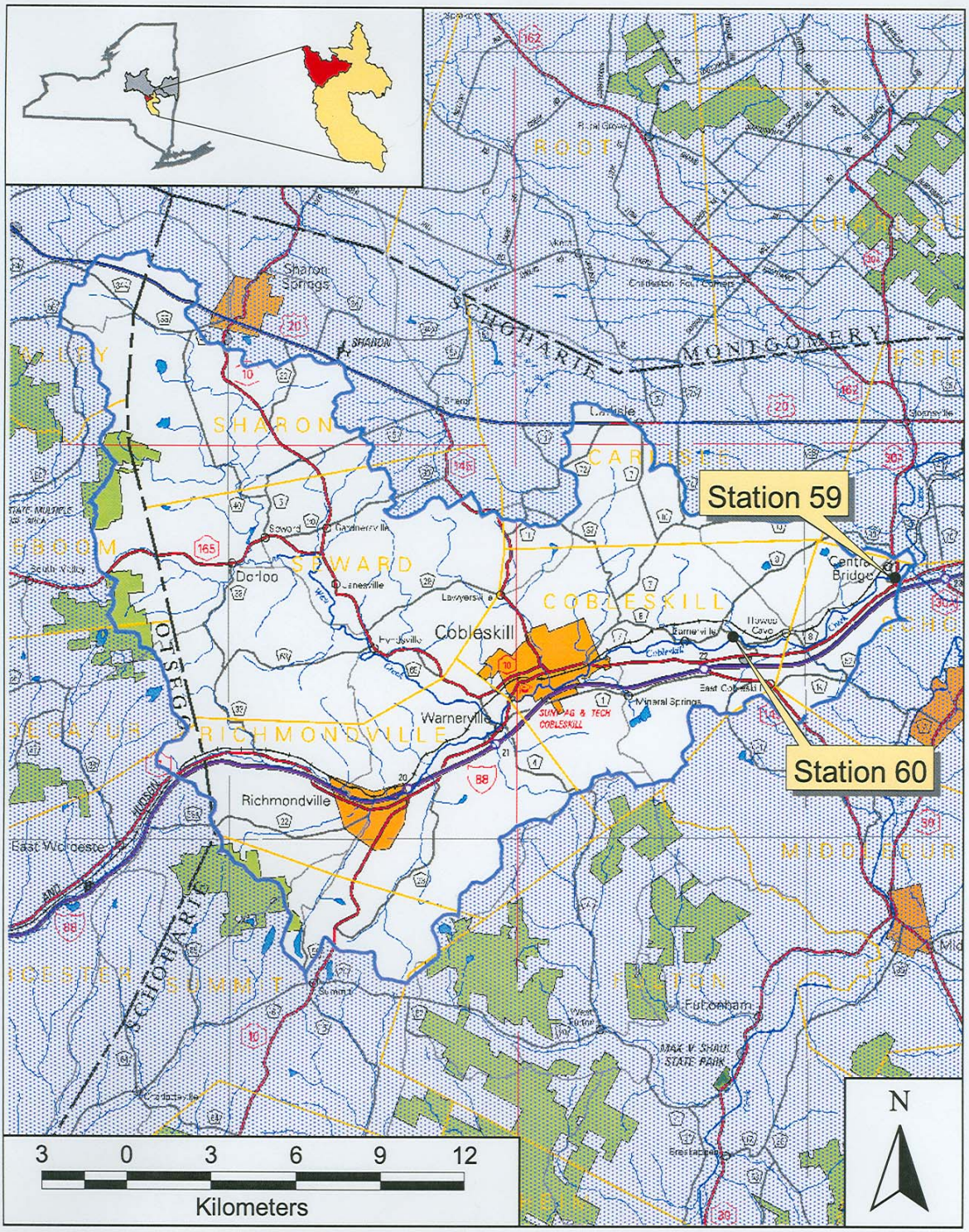


Figure 14. Trackplate station locations in the Cobleskill Creek Watershed (NYS 11 digit HUC).

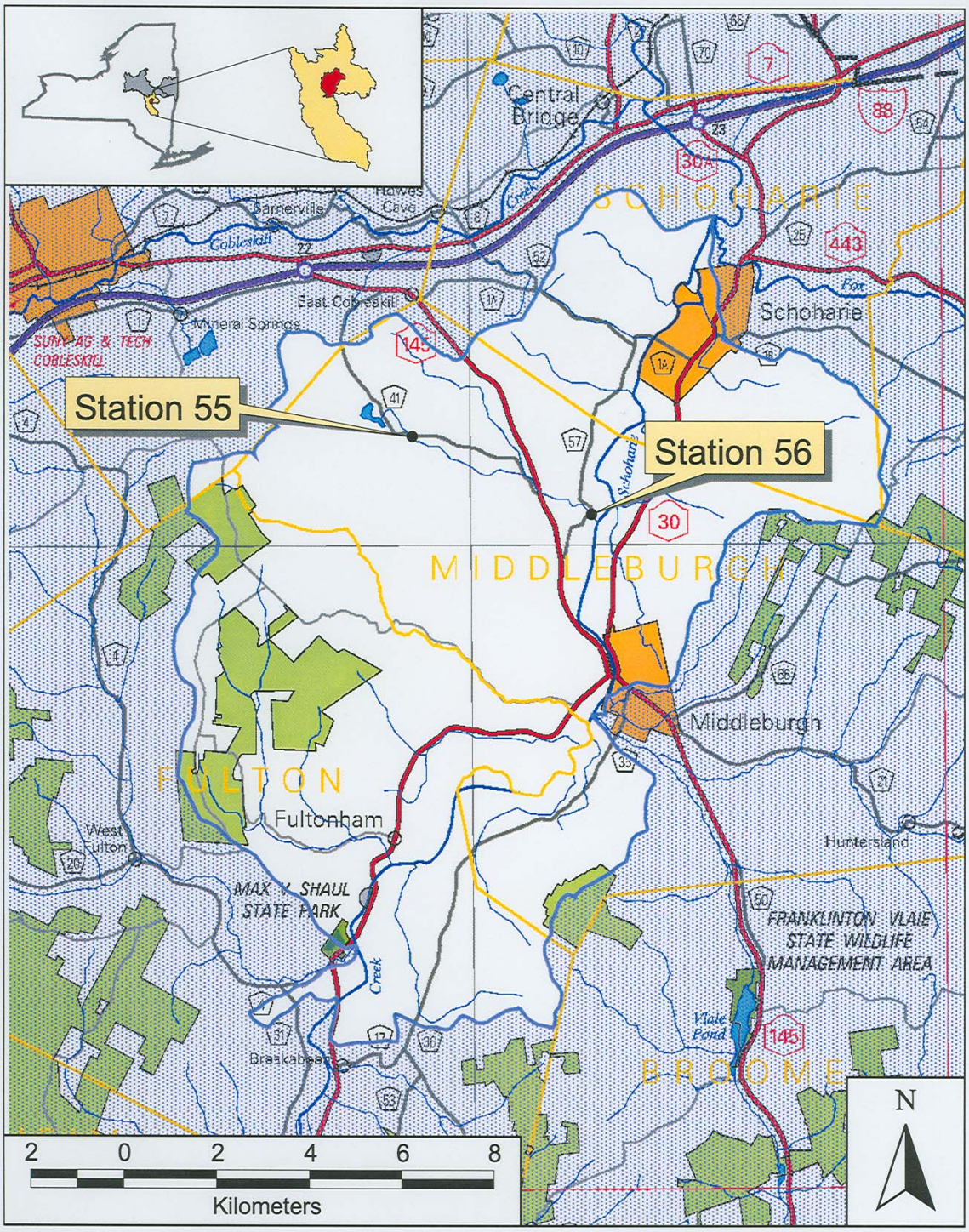


Figure 15. Trackplate station locations in the Middle Schoharie Creek Watershed (NYS 11 digit HUC).

Figure 16. Trackplate station locations in the Fox Creek Watershed (NYS 11 digit HUC).

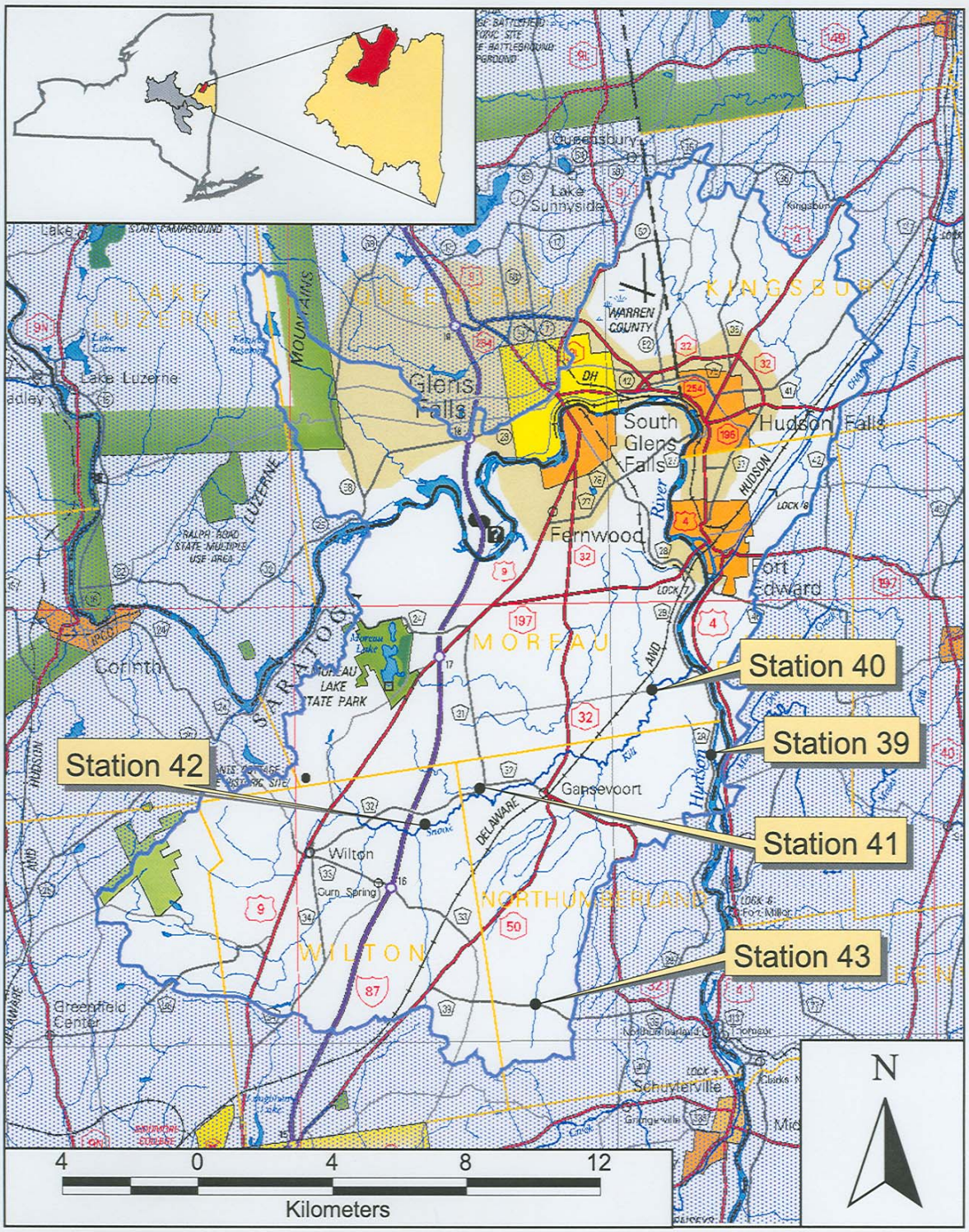


Figure 17. Trackplate station locations in the Hudson River - Clendon Brook to Snook Kill Watershed (NYS 11 digit HUC).

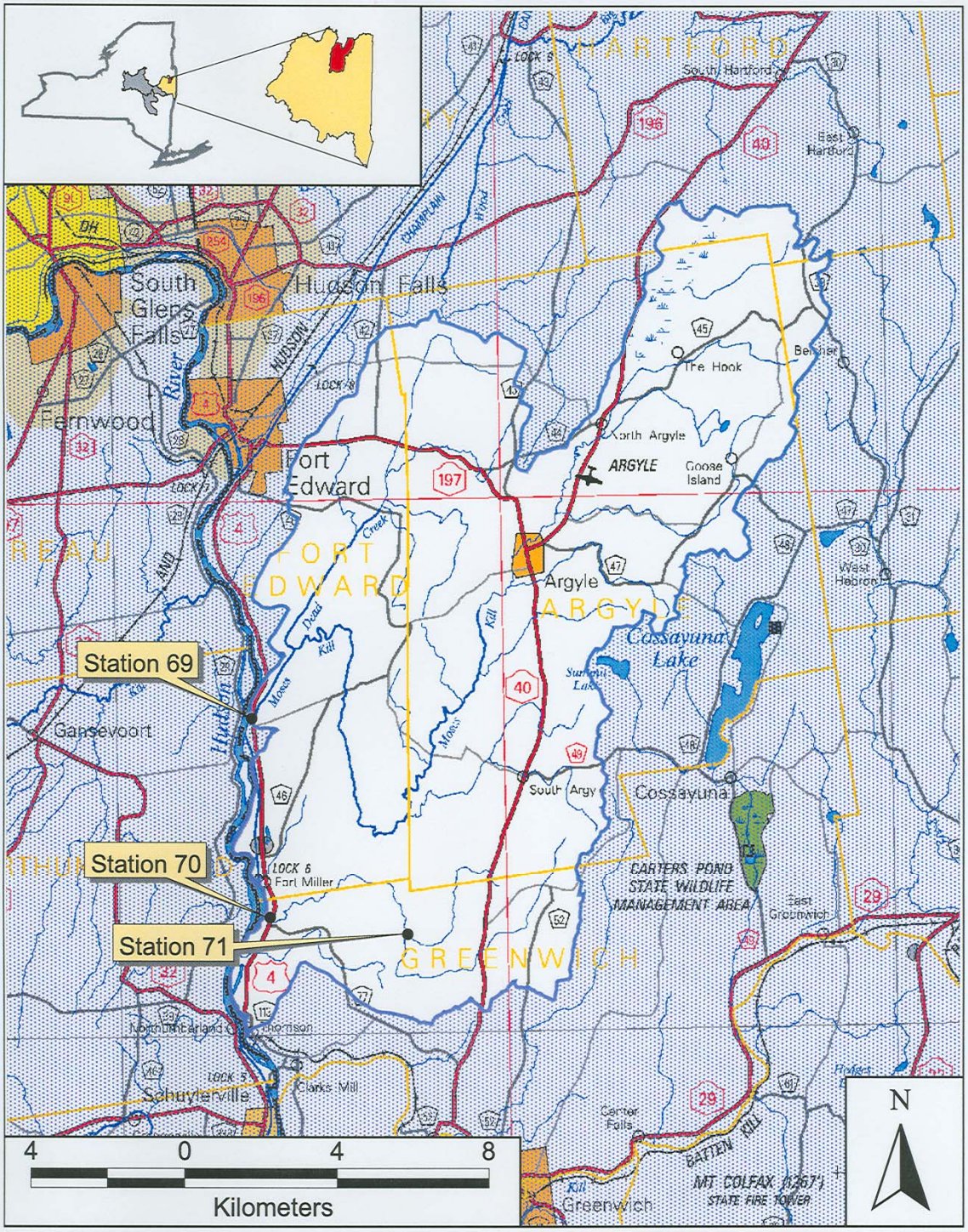


Figure 18. Trackplate station locations in the Hudson River - Snook Kill to Batten Kill Watershed (NYS 11 digit HUC).

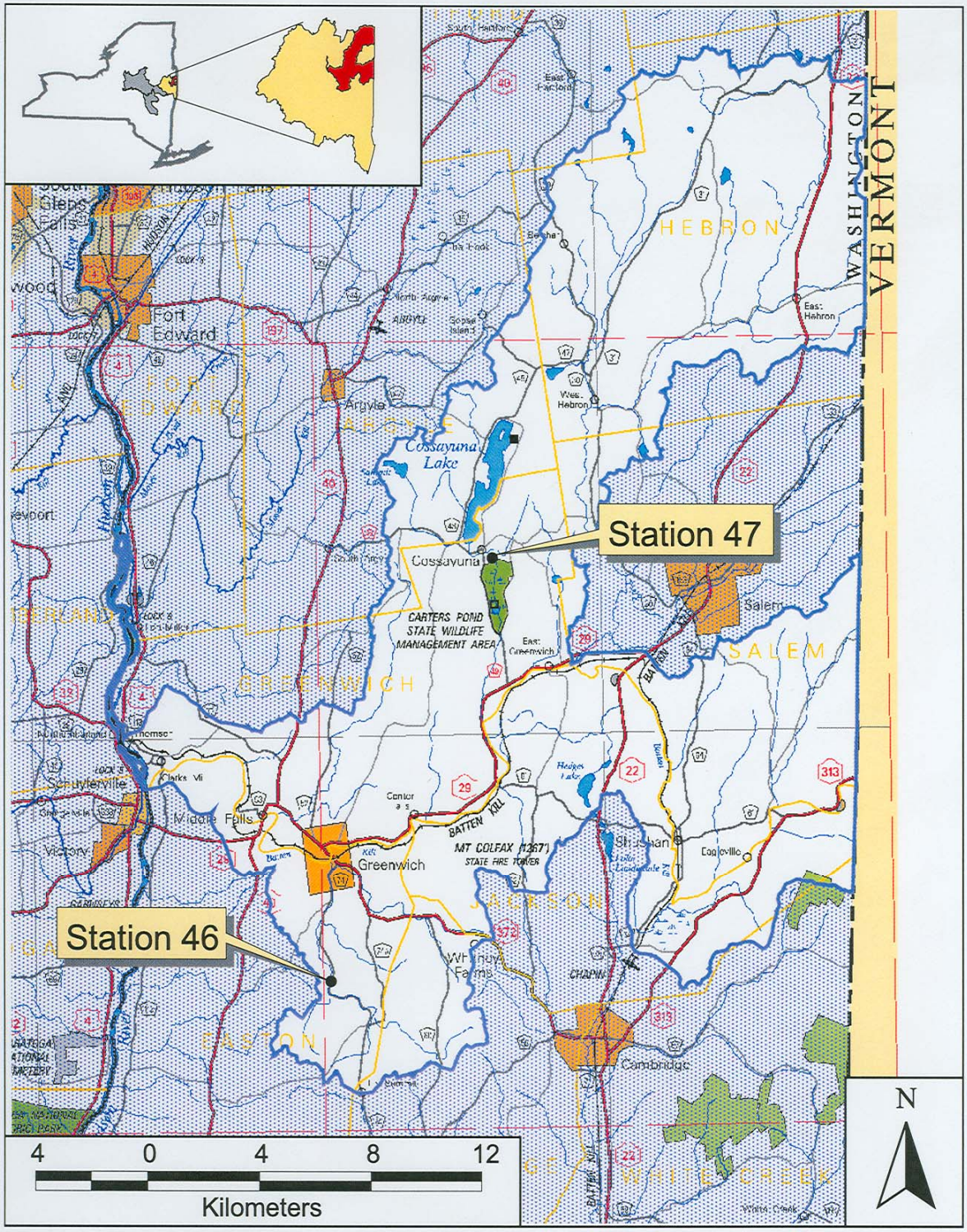


Figure 19. Trackplate station locations in the Batten Kill Watershed (NYS 11 digit HUC).

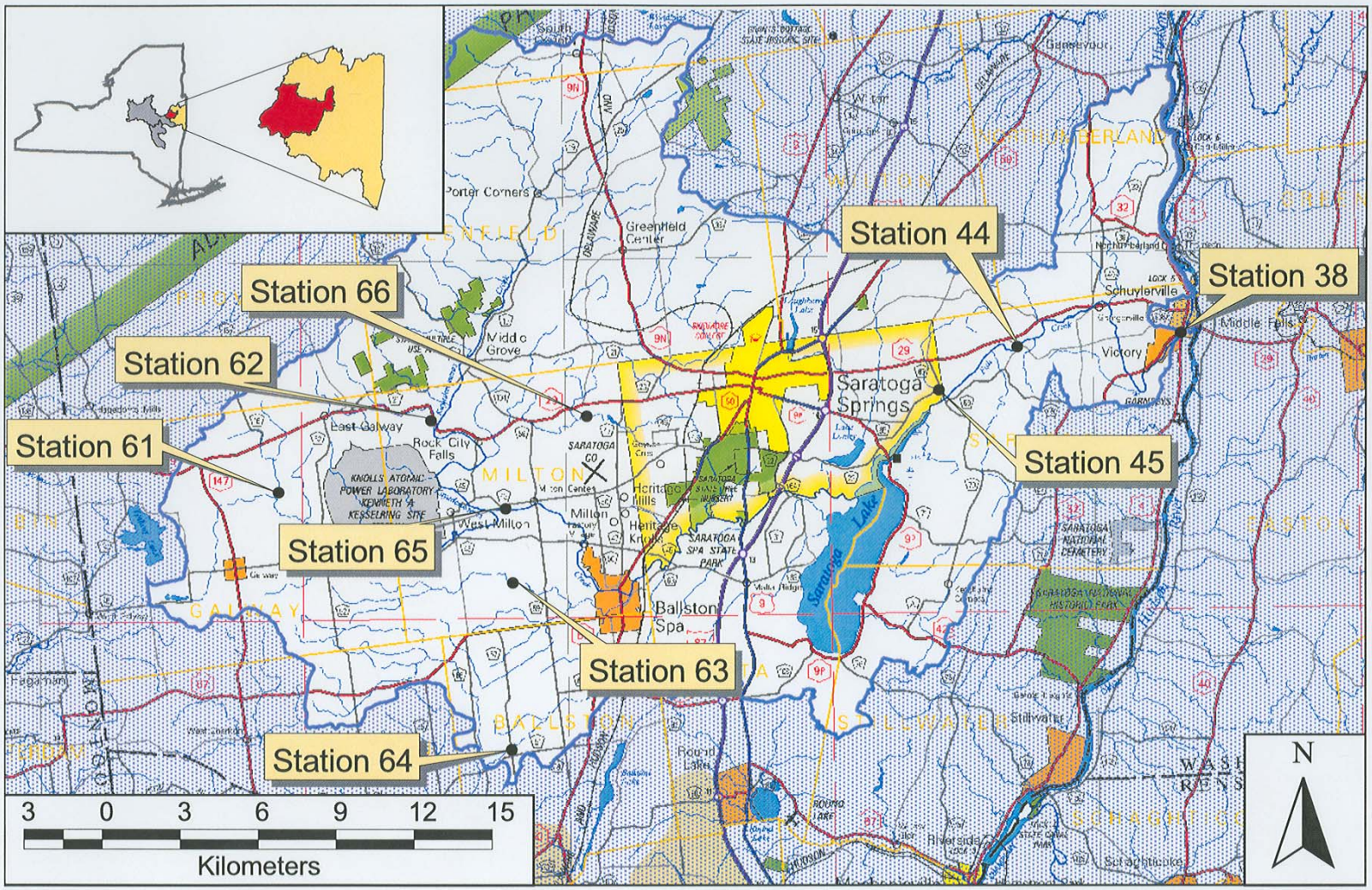


Figure 20. Trackplate station locations in the Hudson River - Snook Kill Fish Creek Watershed (NYS 11 Digit HUC)

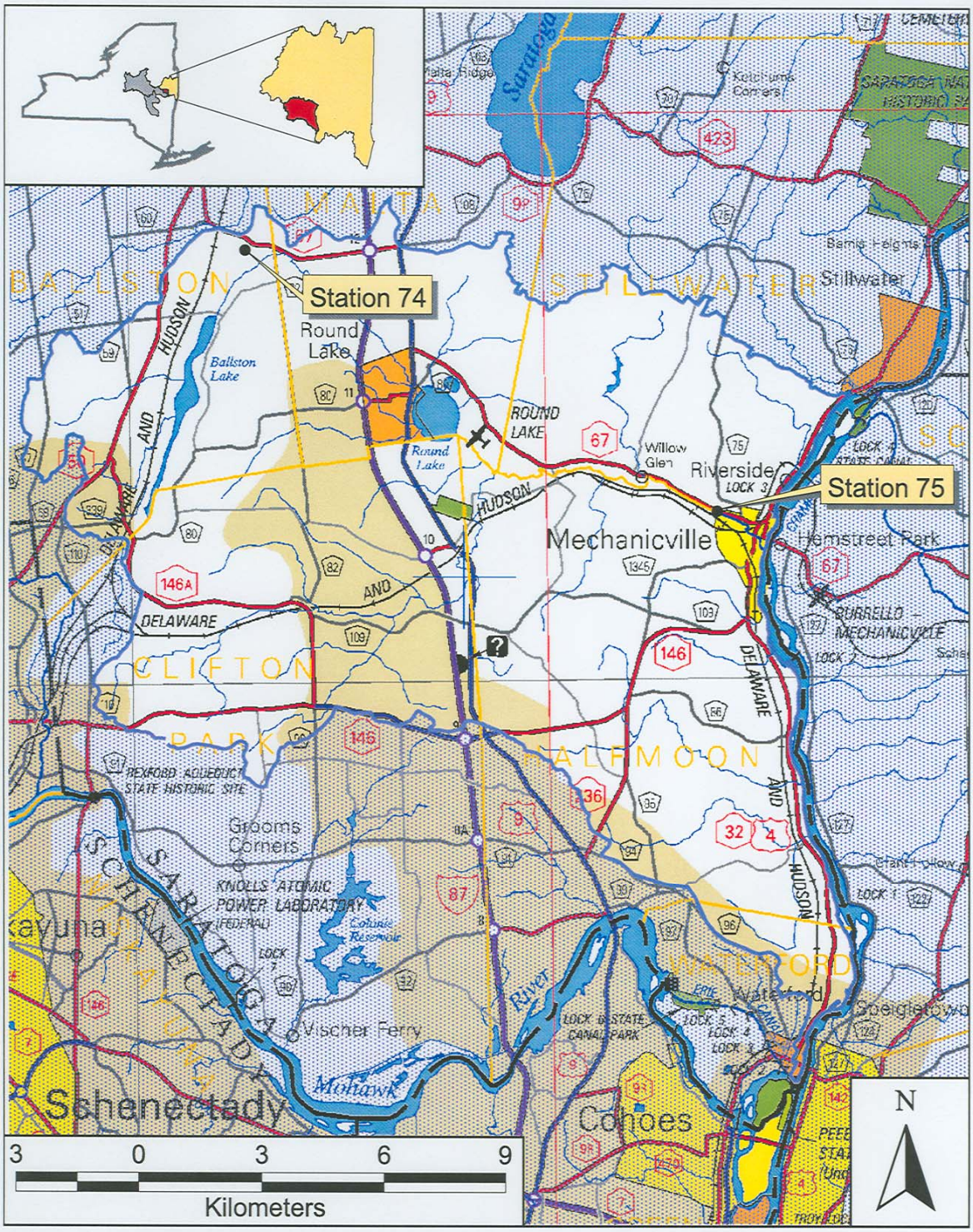


Figure 21. Trackplate station locations in the Hudon River - Hoosic River to Mohawk River Watershed (NYS 11 digit HUC).

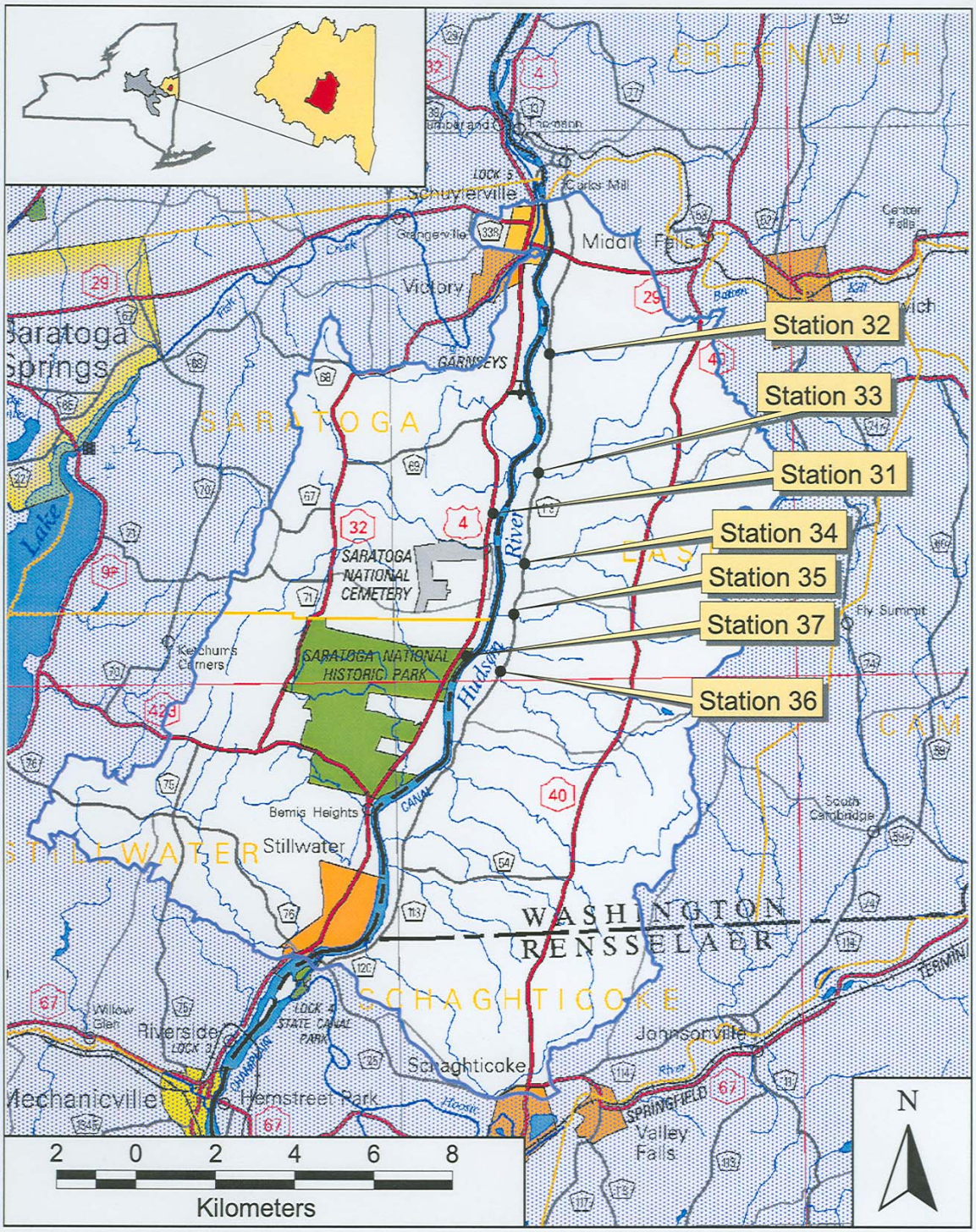


Figure 22. Trackplate station locations in the Hudson River - Fish Creek and Batten Kill to Hoosic River Watershed (NYS 11 digit HUC).

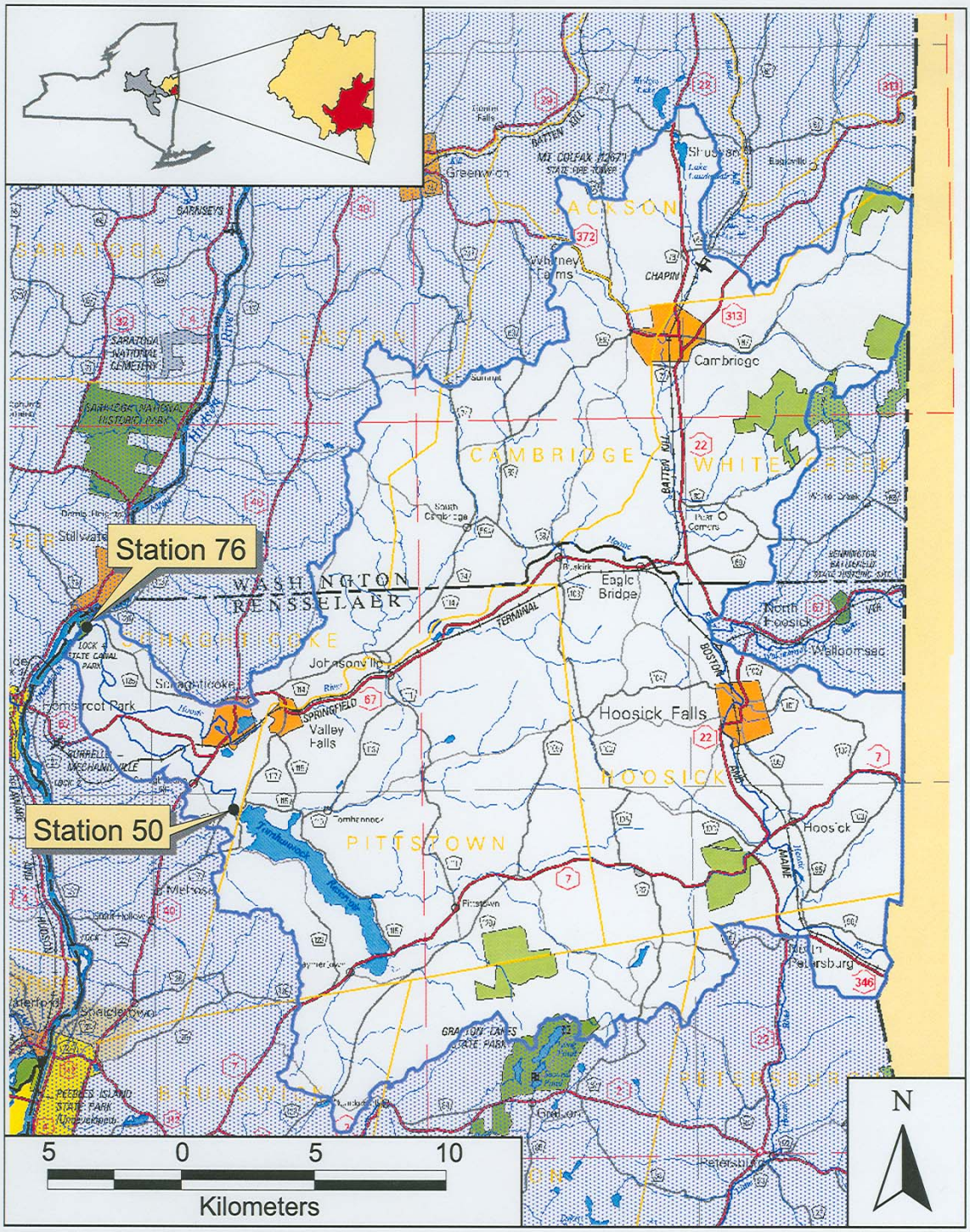


Figure 23. Trackplate station locations in the Hoosic River Watershed (NYS 11 digit HUC).

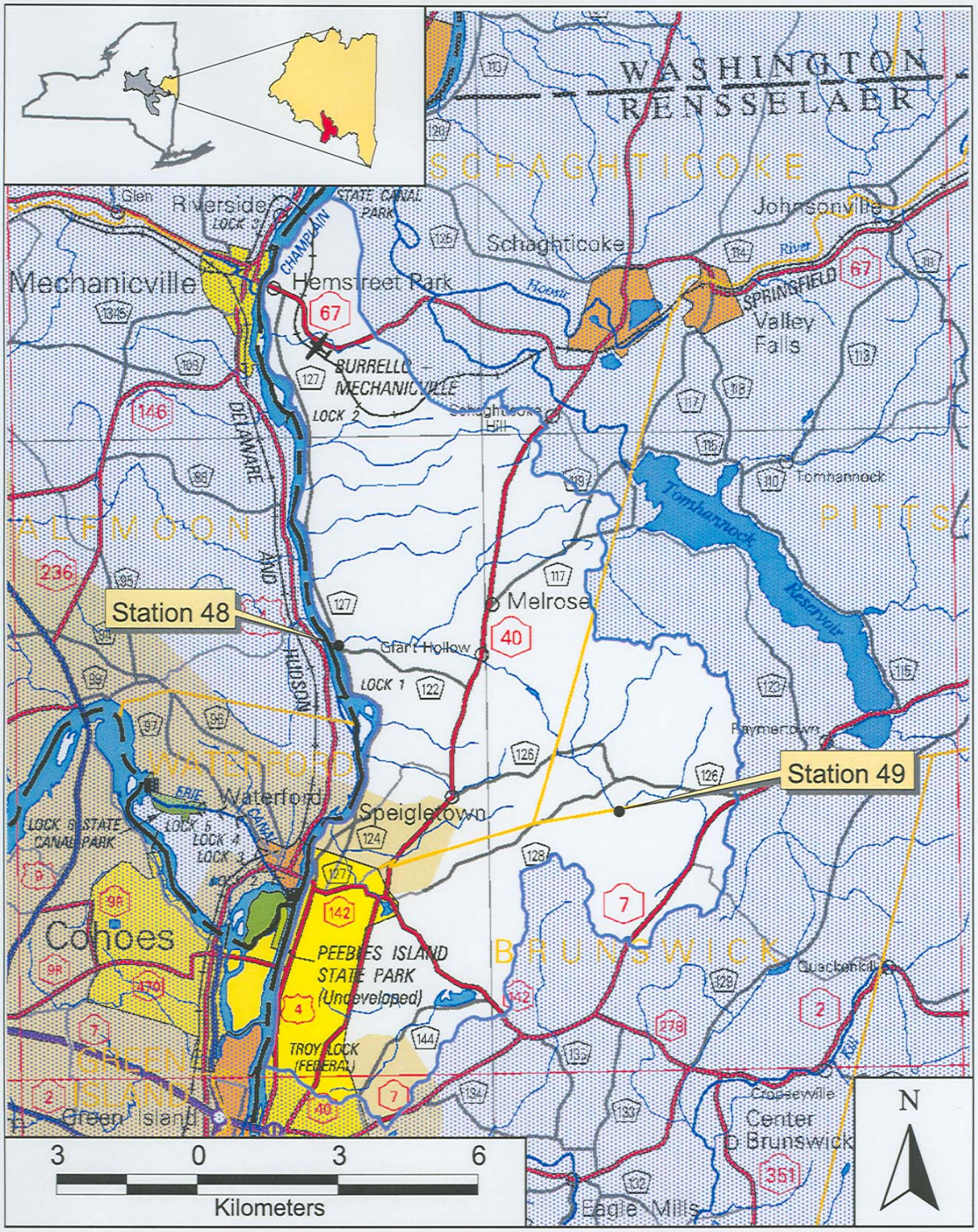


Figure 24. Trackplate station locations in the Hudson River - Hoosic River to Troy, NY Watershed (NYS 11 digit HUC).

Appendix II

Assessment of univariate and multivariate normality of track measurement data for tracks of squirrel and weasel species recorded on shelving paper portion of track plates at scent stations located within the Hudson River and Mohawk River drainages from September 2000 to April 2001.

Table 1. Univariate normality tests for measurements of tracks from squirrels; all measurements per track

Measurement	All Squirrels		Gray Squirrel		Red Squirrel		Chipmunk	
	Statistic[a]	P	Statistic[a]	P	Statistic[a]	P	Statistic[a]	P
A	0.921	< 0.0001	0.996	0.593	0.925	< 0.0001	0.992	0.021
C	0.892	< 0.0001	0.994	0.281	0.970	< 0.0001	0.982	< 0.0001
D	0.925	< 0.0001	0.969	< 0.0001	0.988	0.018	0.977	< 0.0001
H	0.950	< 0.0001	0.989	0.020	0.950	< 0.0001	0.994	0.071
I	0.948	< 0.0001	0.976	< 0.0001	0.992	0.156	0.990	0.003
Sample	1037		301		282		454	

[a]Statistic = Test statistic for Sharpiro-Wilk test for normality

Table 2. Univariate normality tests for measurements of tracks from weasels; all measurements per track

Measurement	All Weasels		Ermine		Long-Tailed Weasel		Mink		Fisher	
	Statistic[a]	P	Statistic[a]	P	Statistic[a]	P	Statistic[a]	P	Statistic[a]	P
A	0.831	< 0.0001	0.877	0.211	0.927	0.417	0.973	0.223	0.882	0.051
B	0.897	< 0.0001	0.942	0.660	0.931	0.460	0.973	0.224	0.836	0.011
C	0.915	< 0.0001	0.828	0.077	0.934	0.486	0.982	0.540	0.898	0.088
G	0.796	< 0.0001	0.938	0.620	0.845	0.050	0.981	0.504	0.971	0.873
H	0.855	< 0.0001	0.953	0.757	0.957	0.749	0.962	0.064	0.923	0.217
Sample	91		7		10		59		15	

[a]Statistic = Test statistic for Sharpiro-Wilk test for univariate normal distribution

Table 3. Multivariate normality tests for measurements of tracks from squirrels; all measurements per track

Species	Sample	Multivariate Skewness			Multivariate Kurtosis		
		Skewness	Statistic[a]	P	Kurtosis	Statistic[a]	P
All squirrels	1037	4.186	726.22	< 0.0001	51.351	31.47	< 0.0001
Gray squirrel	301	3.704	188.30	< 0.0001	44.620	9.97	< 0.0001
Reds squirrel	282	5.534	263.78	< 0.0001	48.902	13.95	< 0.0001
Chipmunk	454	2.035	155.33	< 0.0001	42.301	9.30	< 0.0001
All weasels	91	15.452	244.74	< 0.0001	62.631	15.75	< 0.0001
Ermine	10	12.782	30.467	0.687	28.749	-1.181	0.237
Mink	59	10.997	115.56	< 0.0001	43.785	4.03	< 0.0001
Long-tailed weasel	7	21.182	40.346	0.246	27.608	-1.169	0.243
Fisher	15	16.563	53.002	0.026	35.342	0.079	0.937

[a]Statistic = Test statistic for Marida test for multivariate normal distribution

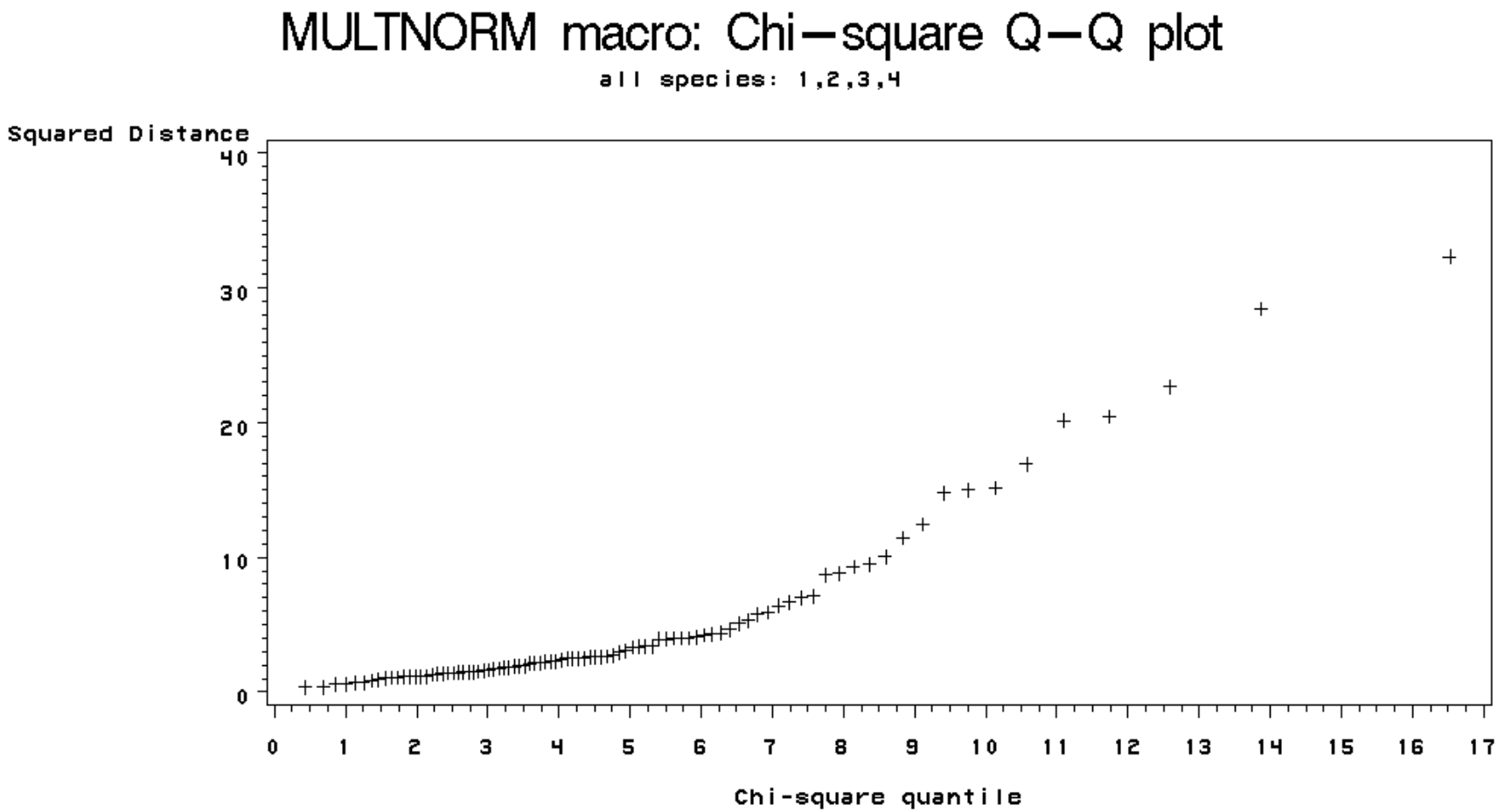


Figure. 1 A quantile-quantile plot of the squared and ordered Mahalanobis distances for tracks of weasel species (ermines, long-tailed weasels, mink and fishers) with quantiles of the Chi-square distribution on five degrees of freedom.

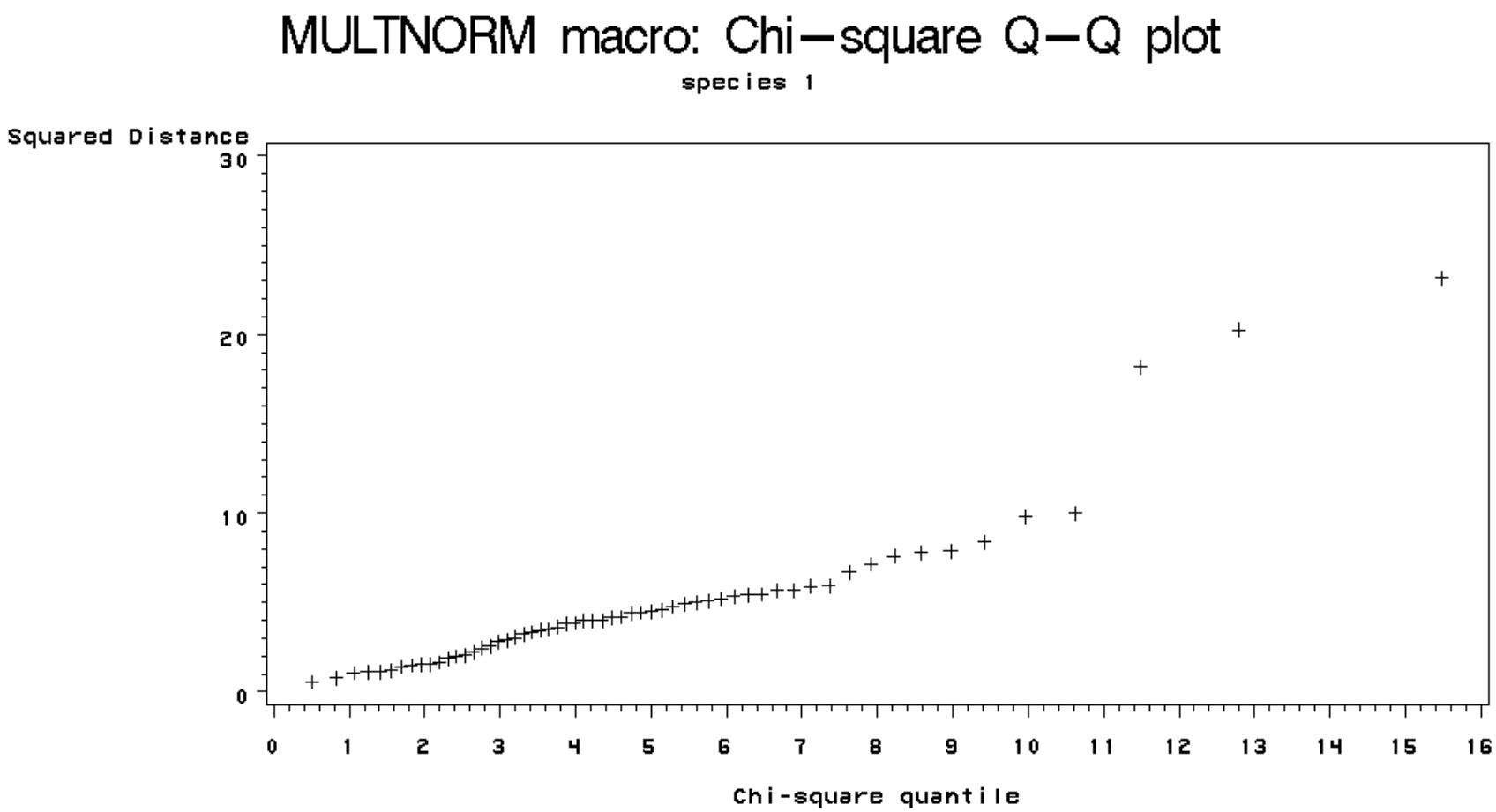


Figure. 2 A quantile-quantile plot of the squared and ordered Mahalanobis distances for tracks of mink with quantiles of the Chi-square distribution on five degrees of freedom.

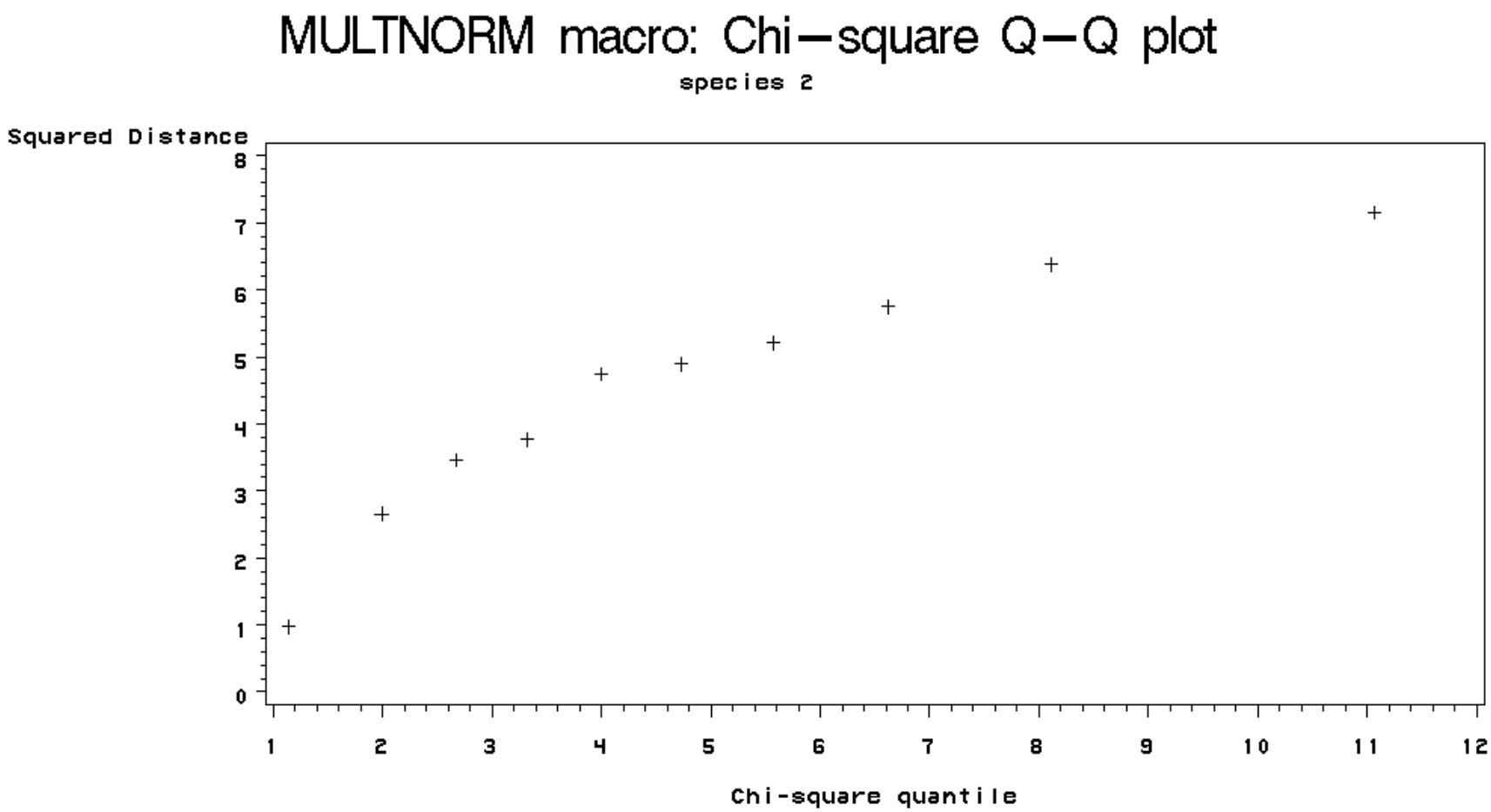


Figure. 3 A quantile-quantile plot of the squared and ordered Mahalanobis distances for tracks of probable long-tailed weasels with quantiles of the Chi-square distribution on five degrees of freedom.

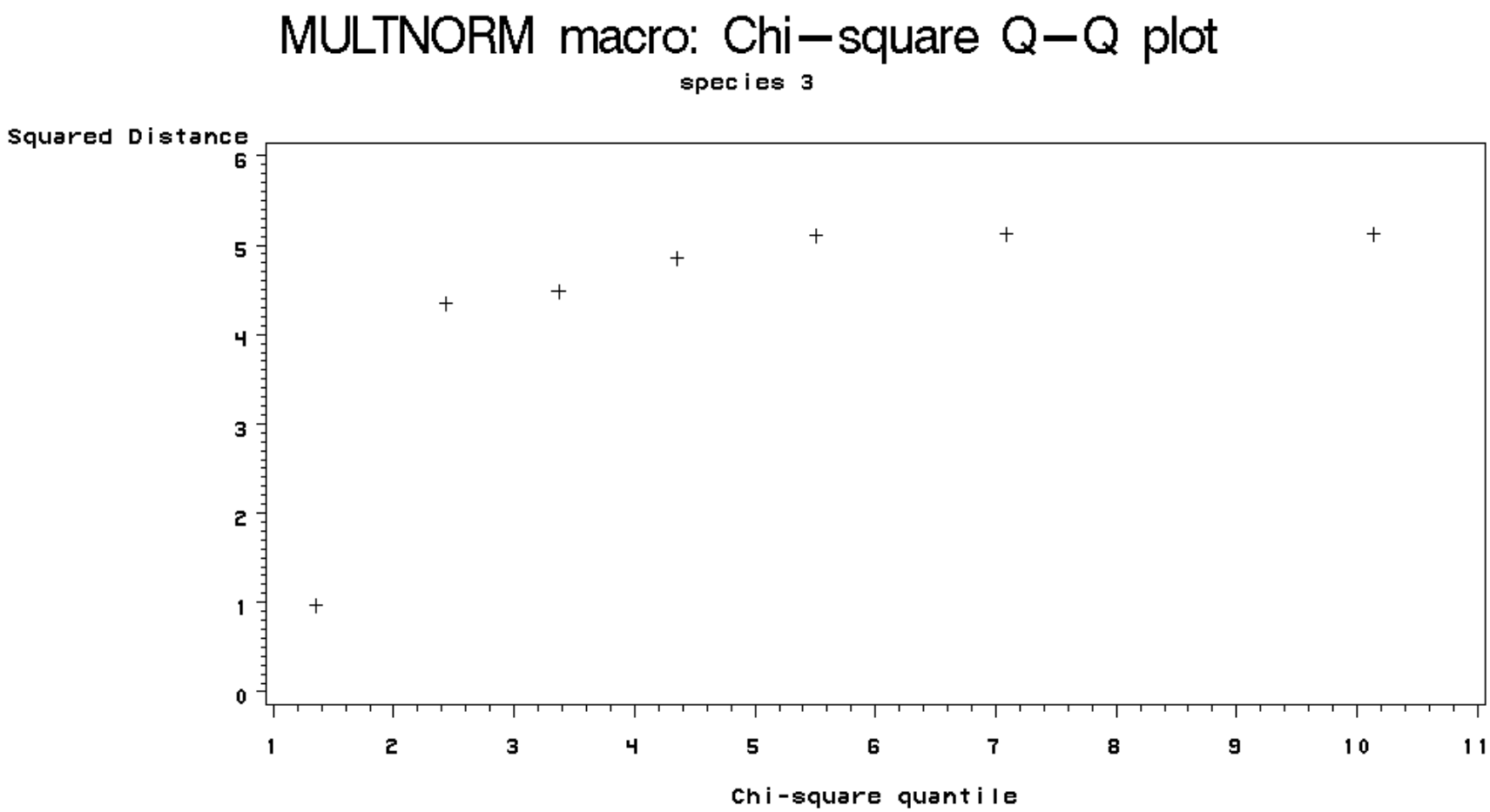


Figure. 4 A quantile-quantile plot of the squared and ordered Mahalanobis distances for tracks of ermines with quantiles of the Chi-square distribution on five degrees of freedom.

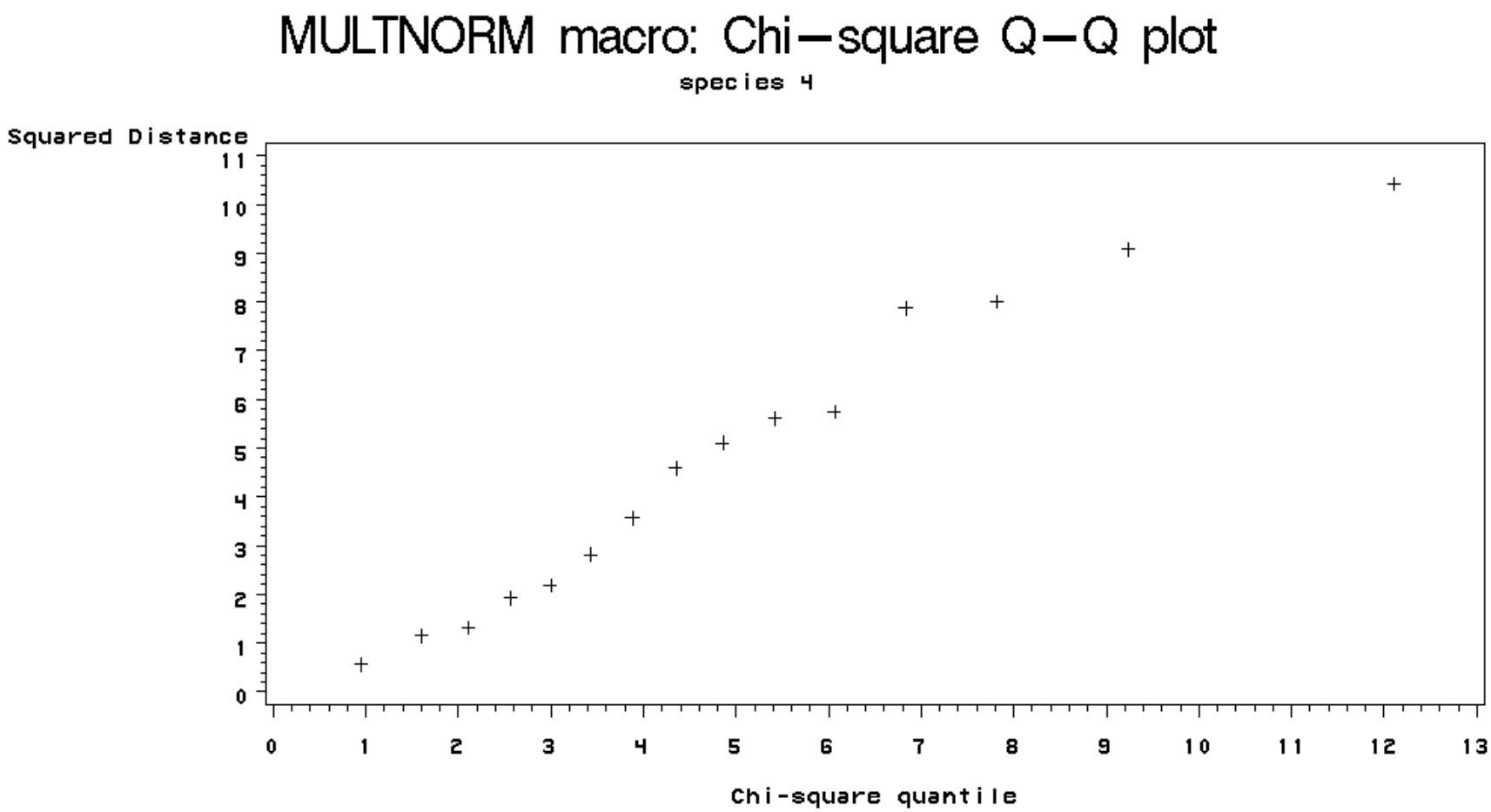


Figure. 5 A quantile-quantile plot of the squared and ordered Mahalanobis distances for tracks of fishers with quantiles of the Chi-square distribution on five degrees of freedom.

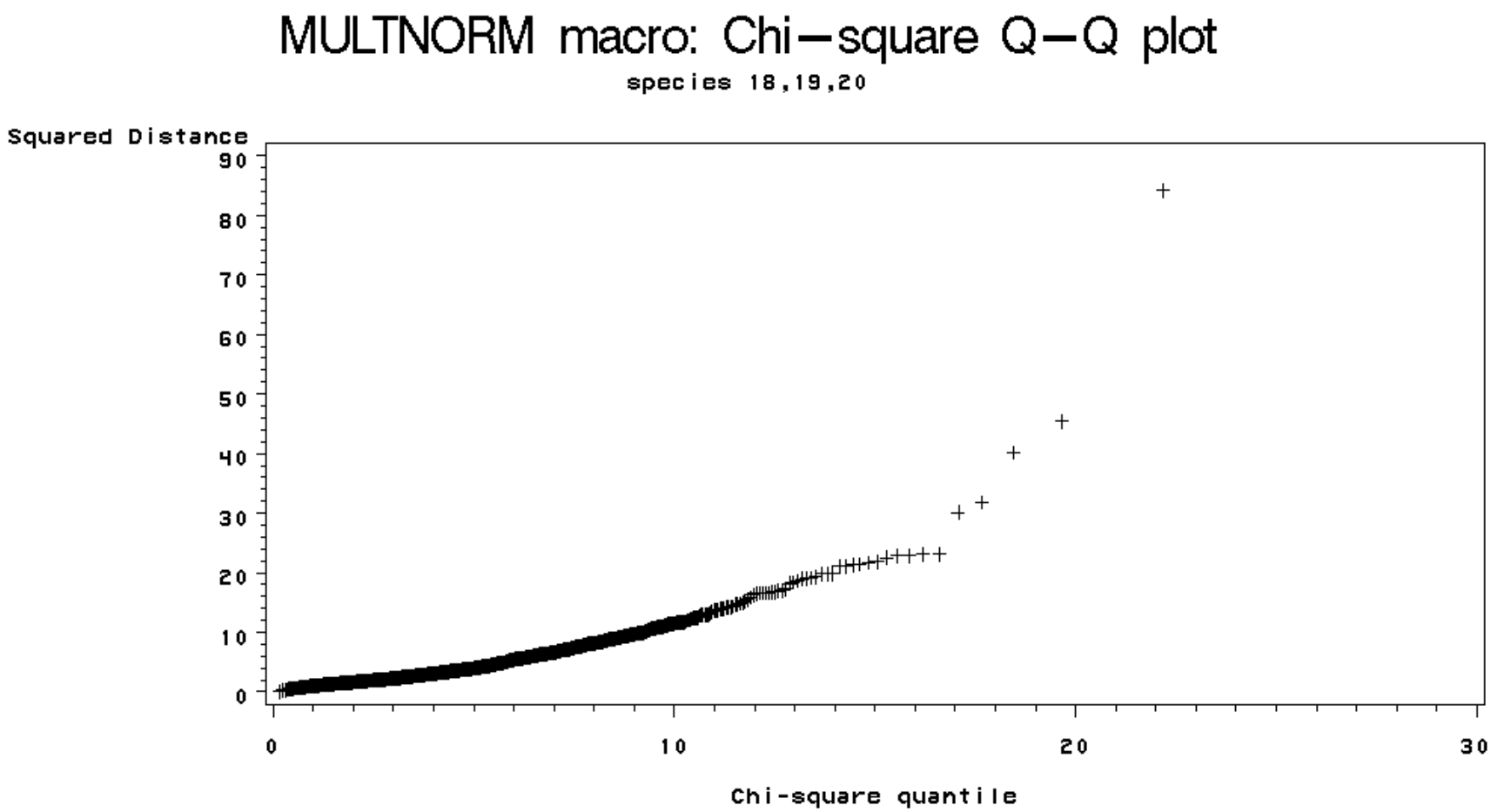


Figure. 6 A quantile-quantile plot of the squared and ordered Mahalanobis distances for tracks of squirrel species (red squirrels, Eastern gray squirrels and Eastern chipmunks) with quantiles of the Chi-square distribution on five degrees of freedom.

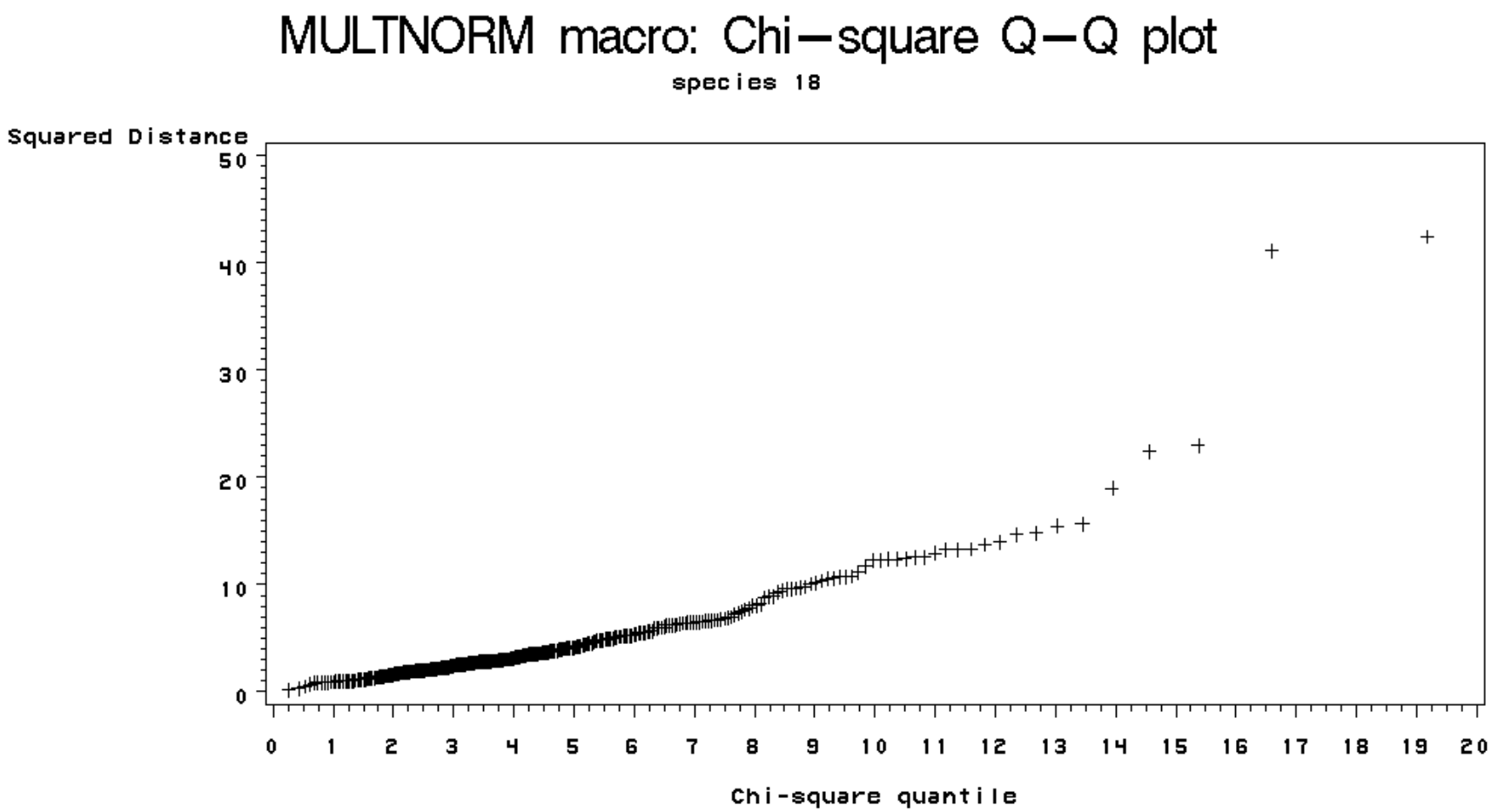


Figure. 7 A quantile-quantile plot of the squared and ordered Mahalanobis distances for tracks of red squirrels with quantiles of the Chi-square distribution on five degrees of freedom.

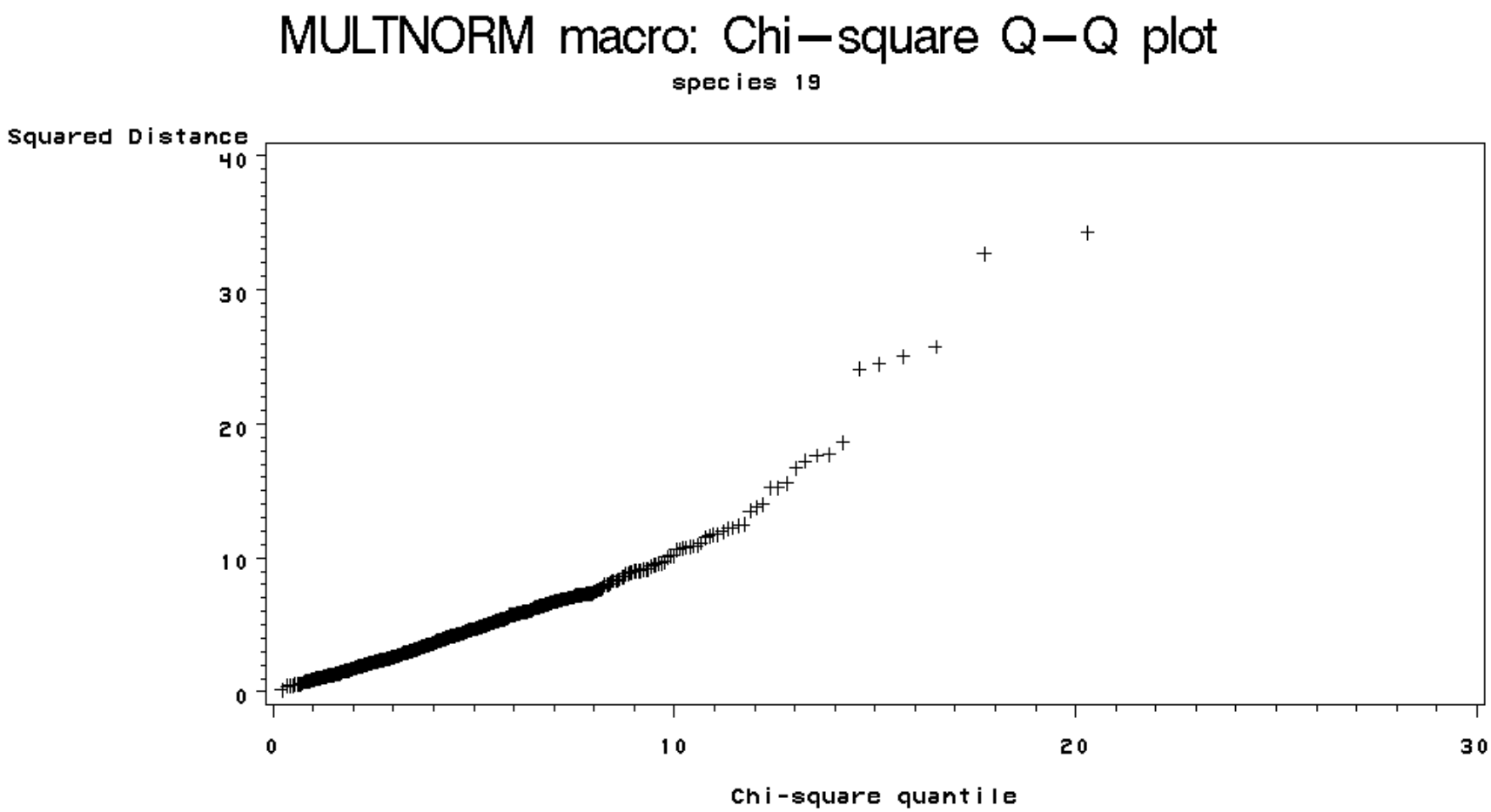


Figure. 8 A quantile-quantile plot of the squared and ordered Mahalanobis distances for tracks of Eastern chipmunks with quantiles of the Chi-square distribution on five degrees of freedom.

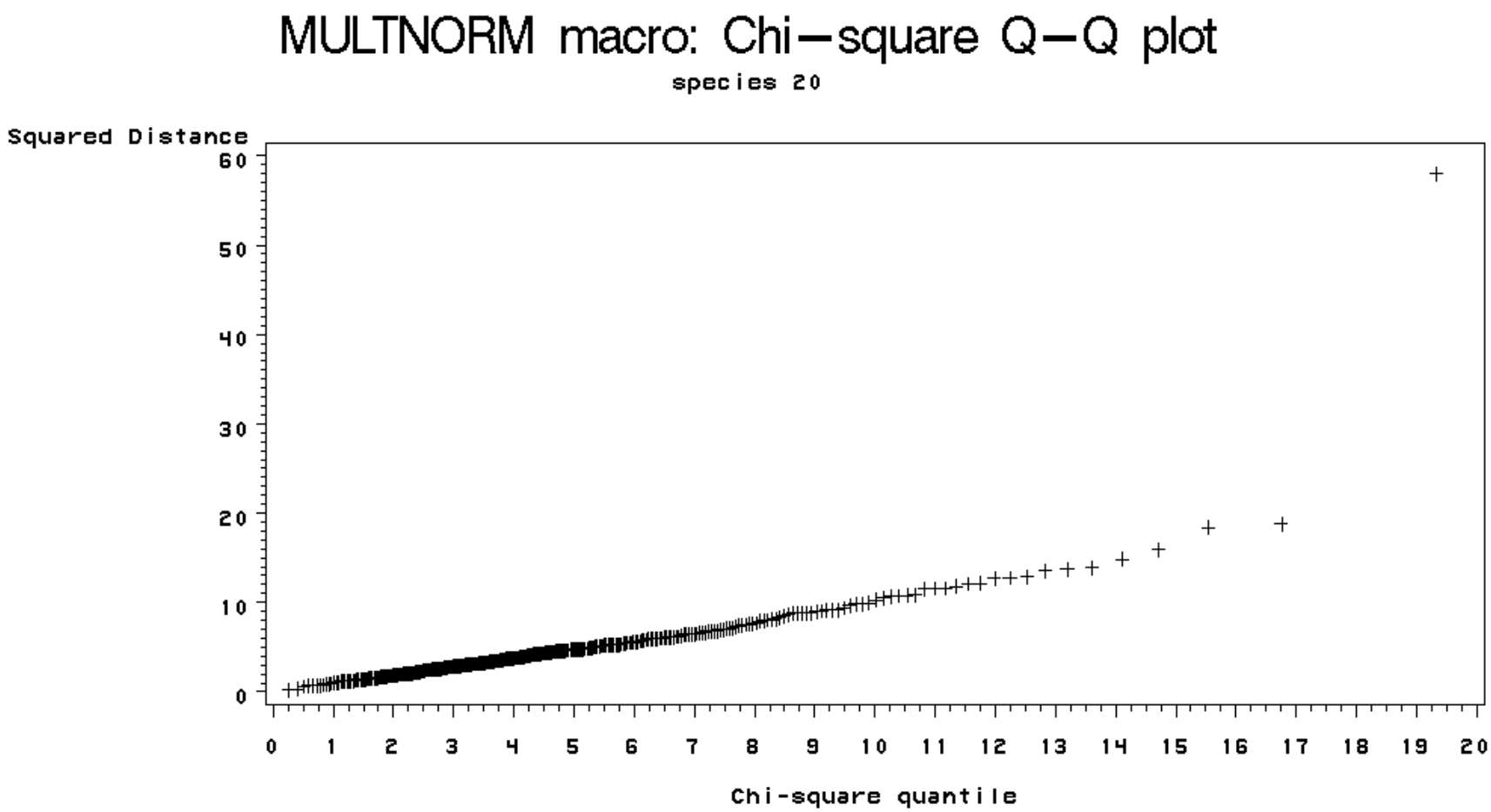


Figure. 9 A quantile-quantile plot of the squared and ordered Mahalanobis distances for tracks of Eastern gray squirrels with quantiles of the Chi-square distribution on five degrees of freedom.