Beaver (*Castor canadensis*) activity, both recent and old, was seen within the project area. These sightings tend to be flowages on streams low in the valleys, though one wetland complex on the Kibby Range ridge has extensive evidence of past impoundment and use by beavers. This is the same wetland complex that is potential northern bog lemming habitat.

Meadow voles (*Microtus pennsylvanica*), Southern red-backed voles (*Clethrionomys gapperi*), woodland jumping mice (*Napaeozapus insignis*), and pygmy shrew (*Sorex hoyi*) were observed in the project area by field personnel during 2005 and 2006. A small mammal trapping study performed for Kenetech in 1992 indicated that common small mammal species present include the Southern red-backed vole and deer mice (*Peromyscus maniculatus*), with several shrew species also being common.

The project area is within the published range of seven bat species, including the silver-haired bat, eastern red bat, hoary bat, northern longeared bat, eastern pipistrelle, big brown bat, and little brown bat, although an eighth species, the eastern small-footed bat, may also occur (DeGraaf et al. 1992). To document bat activity in the proposed project area acoustic monitoring surveys were conducted during spring 2006 and summer/fall 2006.

Bat surveys were performed during the spring, summer, and fall of 2006. These surveys consisted using of Anabat II bat detectors to record the location and timing of bat activity. The surveys consisted of deploying four bat detectors on three separate met towers: two on the southernmost Kibby Range met tower, one on the northernmost Kibby Range met tower, and one on the Kibby Mountain met tower. Detectors were installed at a height of approximately 148 to 164 feet (45 to 50 m) – representative of bat activity at the height of the turbine rotor-swept area – at all three locations, with a lower detector at approximately 49 to 66 feet (15 to 20 m) also installed at the Kibby Range South tower for comparative purposes.

Detectors were deployed on May 4, 2006, and operated through the fall migration season (October 21). Information through the night of June 7, 2006 was included in a spring 2006 reporting, while the balance of monitoring data was addressed relative to fall migration patterns. Detectors were programmed to record nightly from 7 p.m. to 7 a.m.

Bat Survey Results

For the purposes of characterizing spring migration, detectors were deployed on May 4, 2006 and the period through June 7, 2006 was analyzed. Occasional periods occurred when the detectors powered down or animals damaged the detector data collection equipment, which was on the ground at the base of the towers. A total of 108 detector-nights of bat echolocation data were recorded during the spring deployment period (32 detector-nights were lost due to the referenced issues).

A total of 31 bat call sequences were recorded during the spring 2006 sampling period (see Appendix 7-H). All calls were detected at the lower detector in the Kibby Range South met tower. The typical nightly call volume at that location was 1 to 3 calls. The majority of the recorded call sequences (84 percent) were unable to be identified and were labeled as unknown due to very short call sequences (less than 7 pulses), poor call signature formation (perhaps due to a bat flying at the edge of the detection zone of the detector or flying away from the microphone), or static interference. Of the calls that could be identified to species or guild, species within the big brown bat guild were most common (13 percent of all call sequences). Only one call identified as Myotis was recorded, and no red bat/eastern pipistrelle call sequences were identified. No calls were detected at the higher sampling locations.

For the purposes of describing summer activity and fall migration, the detectors were operational on June 20, 2006 and retrieved on October 25, 2006, for a total survey period of 128 nights. As for the spring period, detectors did not function completely during that period. A total of 212 detector-nights of bat echolocation data were recorded during the summer-fall deployment period.

A total of 22 bat call sequences were recorded during the summer/fall 2006 sampling period (see Appendix 7-I). The number of call sequences recorded by each detector ranged from 0 (by the Kibby Range South low detector) to 18 (by the Kibby Range South high detector). Some of this variability may be explained by equipment outages; however, the number of calls per night, detected by all three detectors combined, were generally very low, ranging from 0 to 3 total calls. Nights with peak activity occurred on August 25 to 26, with 4 and 3 total calls, respectively. Of the calls that were identified to species or guild, those of the big brown guild were the most common (68 percent of all call sequences), followed by species within the Myotis guild (14 percent), and the red bat/eastern pipistrelle (5 percent). Some calls (14 percent) could not be identified, as discussed above.

7.6.1.2 Potential Impacts to Mammals

Bats

Although most studies of the potential wildlife impacts of wind power facilities have focused on collisions of birds with turbines, bats are also vulnerable to collisions with wind turbines. In fact, the most recent evidence suggests that bat mortality at wind power developments in the East is more common than bird mortality, as studies that are presently occurring are reporting bat mortality but little to no bird mortality.

When first studied in 1991 and 1992, reported bat mortality at wind facilities was very low (1-2 fatalities per site per year), but more recent studies have documented mortality rates at wind facilities similar to and even exceeding those of birds (California Energy Commission 2002, Keeley et al. 2001). More recent studies documenting mortality at eastern wind power developments have found collision rates of nearly one bat per turbine per day during a swarming period survey (Arnett 2005) and an annual estimate at 46.2 fatalities/turbine/year, which far exceeds any reported fatality rates for avian species (Johnson 2004). The predominant bat species found during most surveys include the tree-roosting species (hoary, red, and silver-haired bats) as well as big brown bats and eastern pipistrelles. No protected species have yet to be found during any mortality studies, despite several projects being located near known hibernacula of several federally protected species, and very few bats of the genus *Myotis* have been found.

The high elevation ridgeline habitats in the project area are not favorable bat habitat, due to their dense tree canopy, high wind speeds, cold climatic conditions, and the lack of wetlands and other suitable feeding habitat. Consequently, tree roosting species, the species that have been found most during mortality studies, are not expected to be abundant along those ridgelines during the breeding and summer swarming season. During migration, it is also not anticipated that bats will concentrate specifically over the ridgelines so potential impacts during these time periods are expected to be low, relative to what has been found at existing wind facilities. Additionally, bat fatality studies have been conducted at projects at more southern locales, where continental bat populations are larger. The location of the project area at the northern limit of most bat species' ranges significantly reduces the relative risk of potential bat fatalities by limiting the total number of bats that are likely to pass by the project area. The relatively low detection rate documented during the 2006 bat detector surveys generally supports this conclusion (see Appendix 7-H and Appendix 7-I).

Other Mammals

Wind turbines will likely have no significant effect on mammal populations in the project area. It is not likely that small mammals such as deer mice, voles, and shrews will avoid wind turbine locations due to vibration, sound, or changes in the habitat characteristic. But, as with songbirds, more diverse areas on the ridgelines may increase the use of the turbine clearings by small mammals. This depends largely on the vegetation community composition which will occur below the wind turbines.

Large mammals are not expected to be impacted. Many of these mammals tend to be highly mobile, far-ranging, and hold large territories. A large territory is apt to contain many small openings (blowdown), and wind turbine clearings will most likely be regarded as such by those animals. Wide, relative undisturbed forest will be found between turbines, which will leave adequate travel corridors for those mammals wishing to avoid the wind turbine clearings.

7.6.2 Reptiles and Amphibians

7.6.2.1 Existing Resources

Reptiles and amphibians are found throughout the project area in spite of often severe weather conditions in the area. A list of potential reptile and amphibian species is presented in Table 7-3. Observations of reptiles and amphibians were made throughout the spring, summer and fall of 2005 and 2006 during various field activities. Eleven species of amphibians and three species of reptiles were observed during field surveys in the project area. These observations were consistent with those detailed in the Kenetech LURC application. The most common species observed were the American toad (Figure 7-29), red-backed salamander (Figure 7-30), wood

Figure 7-29: Toad

Figure 7-30: Red-backed salamander

frog, and garter snake (Figure 7-31), which were found throughout the project area. Other species such as eastern newt, spotted salamander, blue-spotted salamander, spring peeper, green frog, bullfrog, and two-lined salamander were also observed in the project vicinity.

In addition to the general observations made during ongoing field activities, TransCanada's consultants conducted a vernal pool survey during the spring of 2006 in areas where project elements are likely to occur, including the locations for the wind turbines, access roads, substation and the proposed 115 kV transmission corridor (which is discussed in Volume V). The vernal pool survey is discussed in detail in Section 8.5.1. During the vernal pool survey, specific observations were made of wood frog egg masses, spotted salamander egg masses, and blue-spotted salamander egg masses.

No federal- or state-listed rare, threatened, or endangered species used as indicators of significant vernal pools were observed during field surveys. Species that field crews were instructed to document if encountered included:

- Ringed Boghaunter (dragonfly) State-listed Endangered
- Spotted Turtle State-listed Threatened
- Blanding's Turtle State-listed Endangered
- Ribbon Snake State-listed Special Concern
- Wood Turtle State-listed Special Concern

TransCanada will continue to work with the MDEP and USACE to ensure that all appropriate protections for vernal pools are incorporated into the project design. TransCanada has prepared a report of the findings of the vernal pool survey for filing with the MDEP and USACE (see Appendix 8-A). The project will not impact any significant vernal pools, including the associated critical habitat surrounding significant vernal pools. An additional pool and surrounding habitat, that meets the ACOE definition, will also not be impacted.

7.6.2.2 Potential Reptile and Amphibian Impacts

Conditions for reptiles and amphibians are relatively inhospitable in the project area and Maine in general. As a result, only 17 species of amphibians and 10 species of reptiles are expected to be seen in the project area. Of these, 14 species, such as the eastern newt, American toad, pickerel frog, and eastern garter snake are considered widespread or common in Maine. Of the remaining species, three are at the northern extent of their distribution. These species include the spring salamander, four-toed salamander, and redbelly snake.

The spring salamander is typically found in cold, undisturbed high relief mountain streams (Hunter et al. 1992). The species ranges from southern Quebec and central Maine to northern Alabama. Spring salamanders are the least common of Maine's streamside salamanders (Hunter et al. 1992). Its status in the project area is uncertain, as no spring salamanders were

Figure 7-31: Garter snake

observed in area streams. This salamander species is listed as a Species of Special Concern in the state of Maine. Turbine strings will not be located near any streams, and access roads will be kept well away from most streams to the greatest extent practicable. Where stream crossings are unavoidable, the crossings will be made as perpendicular to the stream channel as possible, and will be as narrow as practical. Therefore, impacts to this salamander species are not expected.

Four-toed salamanders are associated with forests dominated by sphagnum moss (Hunter et al. 1992). This highly disjunct species has clumped distribution mostly in southern coastal Maine, with populations along the Penobscot River, Mt. Desert Island and the southern part of Lincoln and Sagadahoc Counties. Since the salamander is Maine's smallest terrestrial vertebrate, there is some debate whether this species is rare or just hard to find in the various parts of Maine (Hunter et al. 1992). Its status in the project area is uncertain, as none were observed. This salamander is also listed as a Maine Species of Special Concern. Turbine strings and access roads will not be located in spaghnum dominated wetlands, and, therefore, impacts to this species are not expected.

The redbelly snake, can be found in almost any habitat including swamps, ponds, fields, and woodlands. This secretive snake has spotty distribution from Nova Scotia to central Florida and west to Kansas. In Maine, this species is readily found in south and coastal regions. Records are rare for northern and western Maine (Hunter et al. 1992), and the secretive habits of this snake may partially account for this scarcity. This species was observed along existing roads in the project area. The redbelly snake is not included on any state of Maine rare or endangered species lists.

7.6.3 Birds

7.6.3.1 Existing Resources

Bird species expected to occur within or migrate through the Kibby Wind Power Project area are listed in Table 7-3. Identification of avian usage of the wind power project area has been the subject of considerable effort by the TransCanada team. Building on the earlier work done by Kenetech in 1992 and 1993, and conducted in consultation with the relevant resource agencies, TransCanada's consultants have completed a full year of avian and bat surveys. Specifically, TransCanada's consultants have completed:

- Fall 2005 and spring 2006 nighttime migration (bird and bat) radar surveys;
- Fall 2005 and spring 2006 morning migrant surveys;
- Fall 2005 and spring 2006 daytime migration surveys;
- Spring 2006 breeding bird surveys (with special focus on the Bicknell's thrush); and

- Spring 2006 and fall 2006 acoustic bat surveys.

Protocols for these surveys were developed in consultation with USFWS, MDIFW, and LURC. In addition, agency personnel were able to participate throughout the survey efforts, through in-field activities and through consultation. Following completion of the 2005 fall surveys, review and discussions of the findings occurred at an inter-agency meeting in order to adjust, as appropriate, protocols for spring avian and bat studies. The findings of subsequent studies have also been reviewed by USFWS, MDIFW and LURC, and comments from those agencies have been incorporated into draft reports (see Appendices 7-F through 7-N). The following sections address the results of each study program.

<u>Nighttime Migration Studies</u>

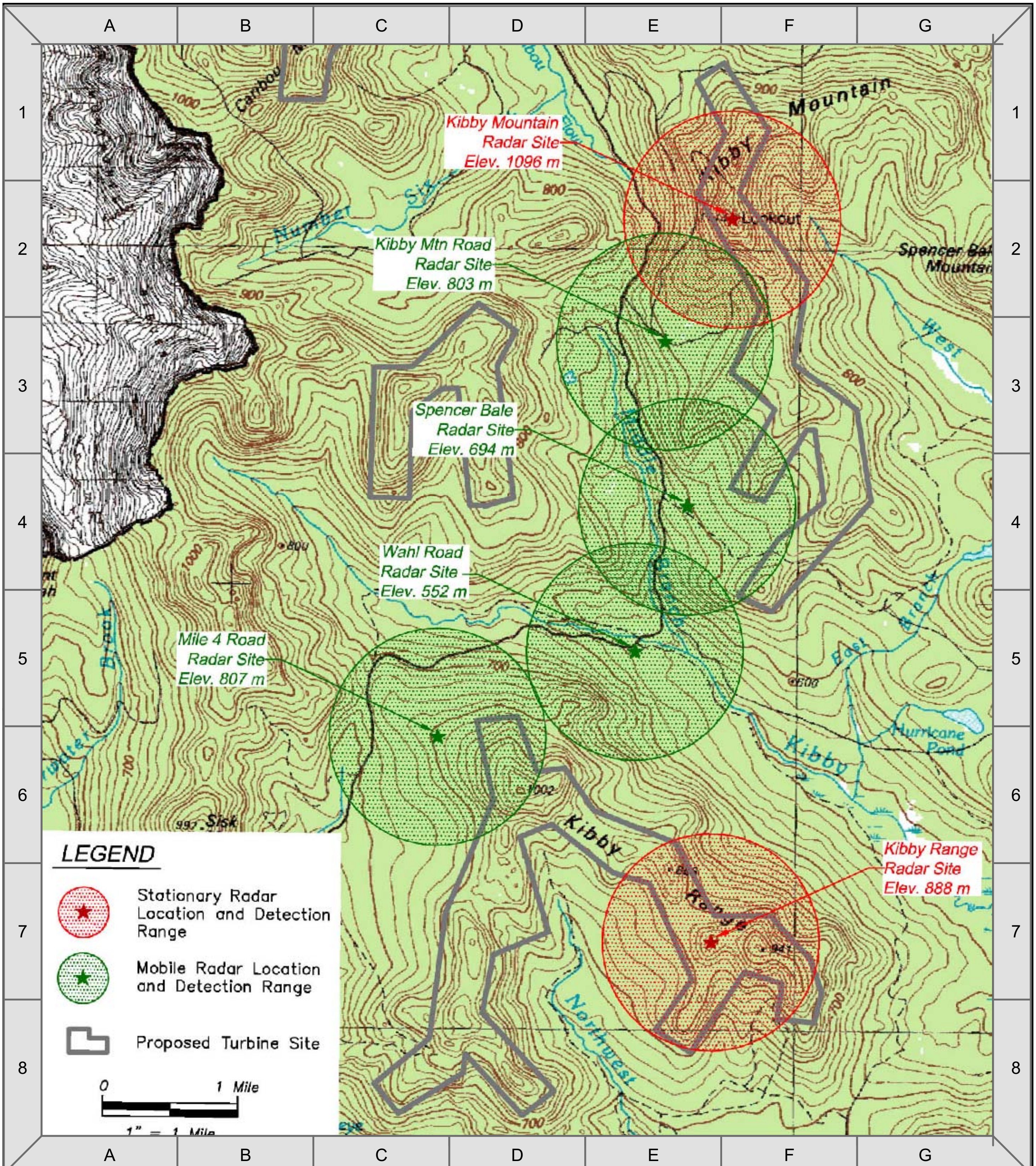
Description of Study Program

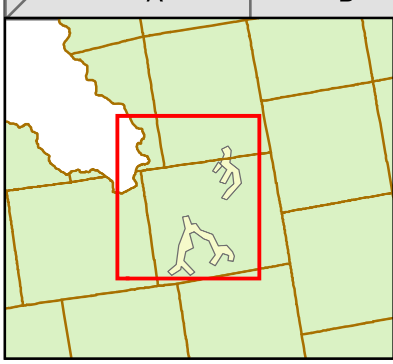
The goal of the investigations was to characterize nighttime migration through the project area using marine surveillance radar. Objectives included documenting overall passage rates for nocturnal migration, including the number of migrants, their flight direction and their flight height. Radar surveys document both birds and bats. Based on overall population levels, it is anticipated that most of the activity documented by radar includes nighttime bird movements, although radar cannot readily distinguish between birds and bats. Consequently, radar data are expressed as targets, rather than birds or bats.

The fall 2005 radar surveys were conducted from sunset to sunrise during each of 29 nights of sampling from August 22 to October 13, 2005. Two ridgeline locations were selected for sampling during two six-night periods each. The radar equipment was mounted on a stationary tower during each sampling event. In addition six nights of mobile sampling along the road system in the project area were targeted to provide additional insight on the habits of migrants in the project area. Mobile surveys consisted of sampling one to four locations one to three times during the night using a radar unit mounted to a truck. The same radar equipment was used for the duration of the study and was moved between sample locations prior to each different sampling event. Fall monitoring locations are shown in Figure 7-32.

During spring 2006, three ridgeline locations were selected for sampling in consultation with agency personnel. In addition, three valley locations were surveyed to provide additional insight on the flight habits of migrants in the project area. In total, 21 nights were sampled during the spring migration season. On three of those nights, two of the three ridgeline sites were sampled simultaneously. Consequently, a total of 25 “radar-nights” of data were collected from May 1 through June 4, 2006. Spring monitoring locations are shown in Figure 7-33.

The radar equipment was operation in two modes throughout the night. In the first mode, surveillance, the antenna spins horizontally to survey the airspace around the radar and detect targets moving through the area. The flight direction of targets can be determined by analyzing the echo trail. In the second mode, vertical, the antenna is rotated 90 degrees to survey





1,500
Meters

Figure 7-32

Kibby Wind Power Project

Fall 2005 Radar Locations

Notes: *Base Map: USGS 24k Topographic Map*

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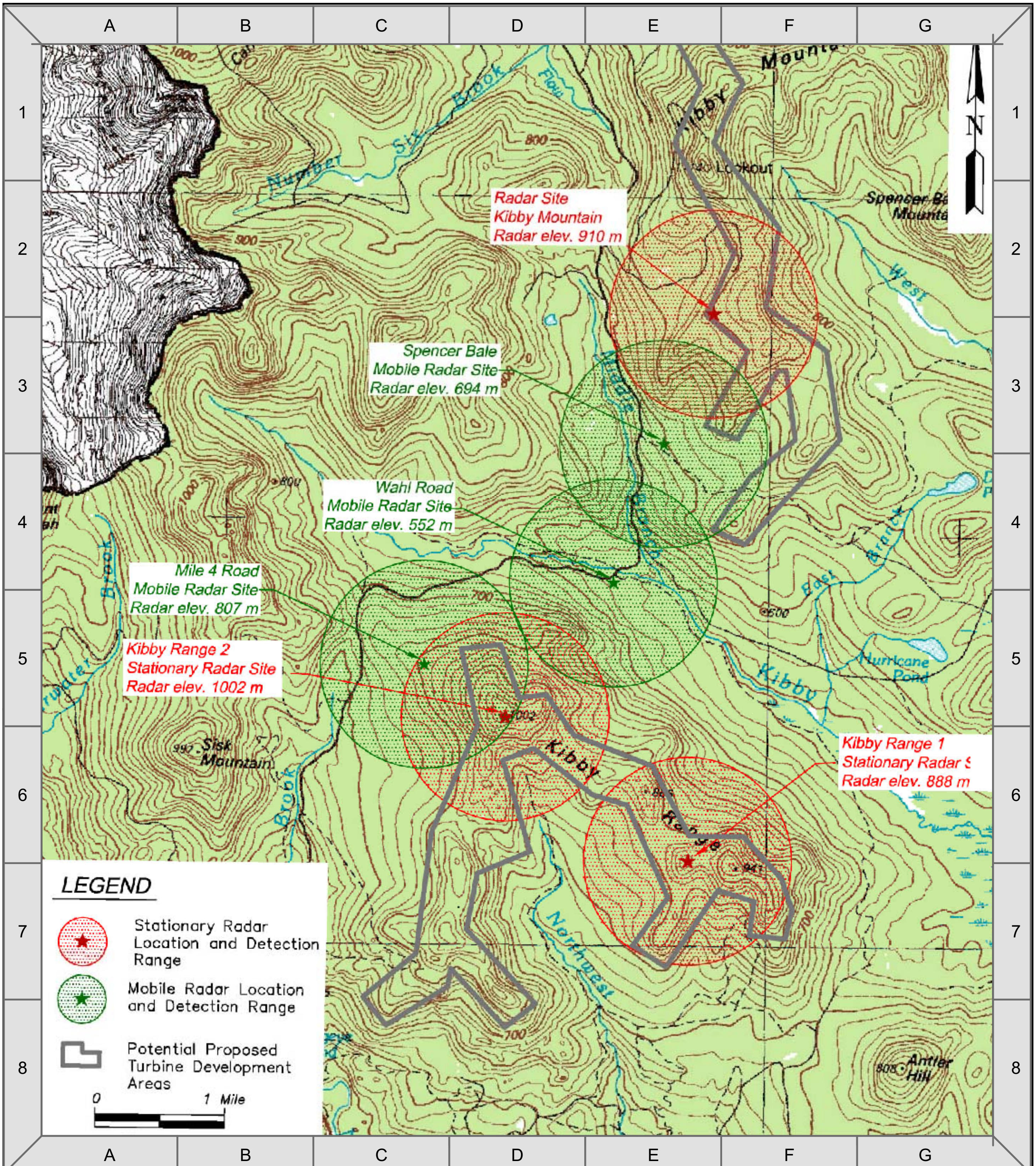

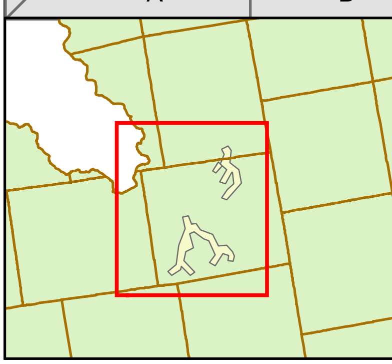

1,500

Meters

Notes: *Base Map: USGS 24k Topographic Map*

Figure 7-33

Kibby Wind Power Project

Spring 2006
Radar Locations

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vertically the airspace above the radar (Harmata et al. 1999). In vertical mode, target echoes do not provide directional data but do provide information on the altitude of targets passing through the vertical, 20 degree radar beam. Both modes of operation were used throughout each hour of sampling.

The radar was operated at a range of 0.75 nautical miles (1.4 km). At this range, the echoes of small birds can be easily detected, observed and tracked. At greater ranges, larger birds can be detected but the echo of small birds are reduced in size and restricted to a smaller portion of the radar screen, reducing the ability to observe the movement pattern of individual targets. The limits of the range setting used are depicted for each of the survey sites each of the above figures.

The radar display was connected to computer video recording software. One-minute samples of the radar video display were recorded for data analysis. Depending on the type of sampling (stationary from the ridgelines or mobile in the valleys), different strategies for recording were employed.

During stationary sampling, 15 1-minute horizontal samples and 10 1-minute vertical samples were recorded during each survey hour. The timing and sequence of the horizontal and vertical samples were based on a random selection for each night. The randomly selected sequence was developed for a 1-hour increment and was repeated once for each hour, throughout the entire night.

During mobile sampling, fewer samples (than stationary sampling) were collected at each location to maximize both the number of sites that could be sampled each night and the number of times each site was sampled. Sampling at each site typically occurred for approximately 20 to 30 minutes, after which the radar station was driven to the next site. Because the amount of time spent at each site was brief, a sample of five to six video recordings of the radar display were collected in rapid succession during both horizontal and vertical operation. The exact number of samples in each operating mode varied from site-to-site and night-to-night due to differences in accessibility, site configuration, and the number of sites sampled on a given night.

Survey Results

Passage Rates

Since most avian migration occurs at night, the results of the nighttime (radar) surveys provide useful information about bird and bat usage and migration in the project area. The nighttime migration surveys found that nightly passage rates during both the spring and fall migration were variable, typical of bird and bat migration (see Appendix 7-G and Appendix 7-H). Variation in mean nightly passage rate from 109 – 1,107 targets/km/hr (t/km/hr) at the ridgeline sites and 52 – 995 t/km/hr at the valley sites was observed during the fall radar surveys. Variation in mean nightly passage rate from 6 – 1,500 t/km/hr at the ridgeline sites and 45 – 1,242 t/km/hr at the valley sites was observed during spring 2006 radar surveys.

During the fall study, passage rates were predictably highest on clear nights, with wind from the northerly direction. For both fall and spring studies, passage rates generally increased rapidly during the first hour after sunset and peaked 6 to 7 hours after sunset followed by a rapid decline.

At both ridgeline sites, an increase in passage rates was documented near the end of the night though this was more pronounced at Kibby Mountain.

Flight Height

During the fall 2005 study, the mean flight height ranged from 1,155 feet (352 m) above the radar at the Kibby Range site to 1,214 feet (370 m) at the Kibby Mountain site. Mean flight heights at the mobile valley sites ranged from 518 feet (158 m) to 1,624 feet (495 m) above radar height. Nightly flight heights were variable, although variation within individual nights was not as pronounced. No obvious relationship between flight height and weather was observed at any individual survey site; there appeared to be equal variation in flight heights between nights with clear weather or poor weather.

During the spring 2006 study, the mean flight height at ridgeline sites ranged from 1,207 feet (368 m) above the radar at the Kibby Mountain site to 1,351 feet (412 m) at the Kibby Range 1 site to 1,240 feet (378 m) at the Kibby Range 2 sites. As for the fall data, flight heights between nights were variable. Hourly flight height stayed generally consistent throughout the night at all sites. At Kibby Range 1, flight height peaked during the hour before sunrise, while at Kibby Mountain flight height decreased during this same hour.

The percent of targets flying less than 410 feet (125 m) – which is the height of the proposed wind turbines – ranged in the fall study from 5 to 56 percent at Kibby Mountain, and from 3 to 35 percent at Kibby Range. The overall mean percent of targets below turbine height was 16 percent at Kibby Mountain and 12 percent at Kibby Range. At Kibby Mountain, the nights with the largest percentage of targets flying lower over the ridgeline were typically associated with nightly passage rates that were well below the seasonal mean passage rate for the site. For example, on the night of September 29, 56 percent of the targets were flying below turbine height. The passage rate for that night, however, was the lowest documented at that site (109 ± 28 t/km/hr), even though conditions were favorable for migration. A similar trend was observed at Kibby Range. The two nights with the largest percentage of low-flying targets (October 3 and 7) were the two nights with the lowest passage rates. During the spring 2006 study, the overall mean percent of targets below 410 feet (125 m) was 14 percent at Kibby Mountain, 22 percent at Kibby Range 1, and 25 percent at Kibby Range 2.

Flight Direction

During the fall 2005 study, mean nightly flight directions were similar between the two ridgeline sites (167 degrees at Kibby Mountain and 196 degrees at Kibby Range). In general, flight was in a southerly direction across the entire project area. There was night-to-night variation, particularly at Kibby Range. Overall, the nights with the highest passage rates were associated with flights to the south, while those with lower passage rates sometimes included a majority of flights in directions contrary to typical migration patterns. On these latter nights, winds were often moderate to strong and from a southerly direction.

The spring 2006 study determined that mean nightly flight directions were also similar between the three ridgeline sites (67 degrees at Kibby Mountain, 50 degrees at Kibby Range 1 and 86 degrees at Kibby Range 2). Overall, the nights with the highest passage rates were associated with flights to the northeast, while those with lower passage rates sometimes included a majority of flights in directions contrary to typical spring migration patterns. A notable exception to the norm was the night of June 1 at the Kibby Range 1 site. The passage rate for that night was more than twice the season mean for the site and flight direction was to the west-southwest despite relatively light winds from the north. These flight characteristics on this one night somewhat skew the distribution of flight directions.

Discussion of Results

This study expanded upon radar surveys previously conducted at the site in 1994. The previous surveys were conducted in May, June, August, September and October 1994 (ND&T 1995a, b) using a marine surveillance radar nearly identical to the radar used in this study. The previous spring study was conducted on 17 nights at 2 locations; the fall study was conducted on 14 nights from 1 of those 2 locations. The results of these surveys are consistent with the results of the fall 2005/spring 2006 studies (see Appendix 7-G and Appendix 7-H). Passage rates observed during the fall/spring 2006 studies are generally within the range of those observed in other studies conducted for similar projects in the Northeast (see Appendix 7-G and Appendix 7-H).

Flight height, in general, is one of the least understood aspects of bird migration. Radar studies have largely confirmed that the majority of nocturnal bird migration appears to occur less than 1,640 to 2,300 feet (500 to 700 m) above the ground (Able 1970, Alerstam 1990, Gauthreaux 1991, Cooper and Ritchie 1995). It appears that, at the Kibby Wind Power Project site, migrants fly within the confines of the valleys, as well as flying well above the ridges of the project area. Flight elevations above the ground level were also similar between valley and ridge areas, and are predominantly above the rotor-swept zone of the proposed turbines.

Simultaneous sampling occurred on four nights during spring 2006. From May 17 to 19, two of the ridgeline sites (the Kibby Range 1 site and the Kibby Mountain site) were sampled. Passage rates were higher at the Kibby Range 1 site than the Kibby Mountain site during all three nights of simultaneous sampling (three-night mean of 300 ± 101 t/km/hour versus 153 ± 59 t/km/hour). The mean flight heights between sites for these nights were similar, ranging from 1,555 feet (474 m) to 1,650 feet (503 m). The flight direction for the two sites was also similar, with a mean flight direction of 66 degrees.

Foraging Migrant Studies

Description of Study Program

Daytime avian foraging surveys (foraging surveys) are intended to supplement nighttime radar surveys regarding migrant species occurrence in the project area vicinity. The radar studies quantify passage rates of nighttime migrants through the project area, but cannot distinguish taxonomic classifications of the migrants. Daytime surveys were performed to augment the radar data and to determine what species occur in the project area during migration.

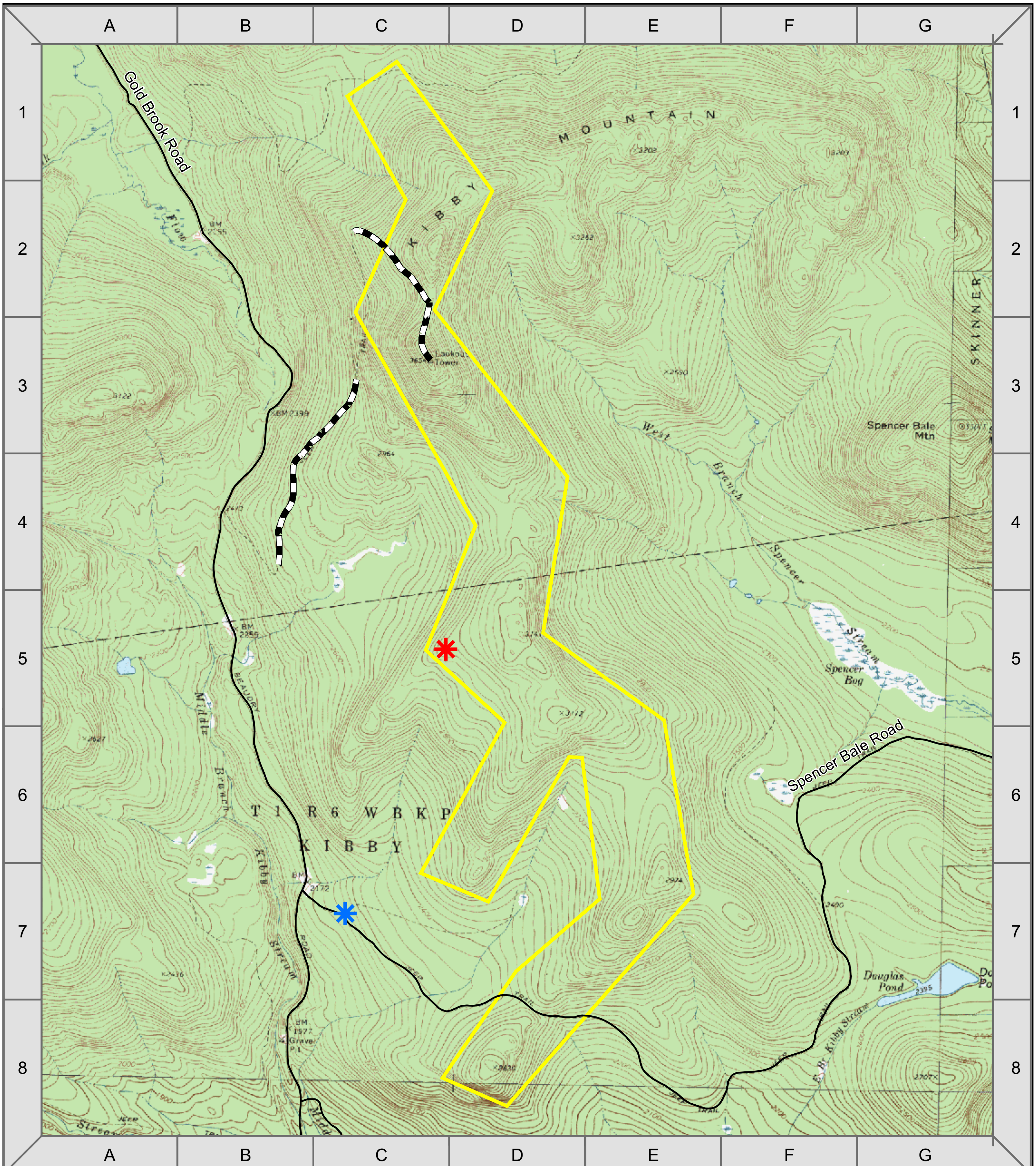
Basic methodologies for fall 2005 and spring 2006 daytime avian foraging bird surveys were similar to those performed during the fall of 1994 for Kenetech (ND&T 1994a, 1994b, 1995a and 1995b). However, in 2005 and 2006, a greater amount of effort was expended. Specifically, four transects were surveyed in 2005, as opposed to only two in 1994. These additional transects increased the overall units of effort ([length of transect [specify units]] x [number of visits]) expended in 2005 and 2006 (as compared to 1994).

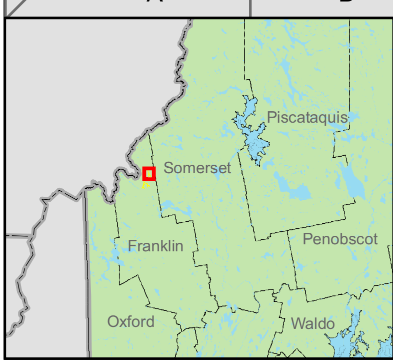
An interagency meeting with MDIFW, USFWS, LURC, DEP, and the USACE was held August 18, 2005, to discuss proposed migration studies for the fall 2005. During this discussion, Mr. Thomas Hodgman, MDIFW Bird Group, recommended conducting morning foraging migrant studies and noted that the prior studies performed for Kenetech were an appropriate model to follow. Subsequent to that meeting, a written study protocol was prepared and reviewed by MDIFW. In February and April 2006, further discussions were held with Mr. Hodgman regarding spring 2006 field studies. As a result of these discussions, spring 2006 surveys were conducted using the same general approach as that used in the fall of 2005.

The surveys were performed by one observer walking slowly along a transect early in the morning. All birds observed were identified to species (whenever possible), and distance from the transect was estimated and recorded. The behavior of each bird when first observed and foraging birds' locations (including where they were foraging, i.e., substrate: ground, shrubs, trees, etc.) were noted.

Daytime avian foraging surveys typically began at dawn and ended before noon each day. Sampling was performed based upon favorable weather for bird observation. Surveys were not conducted during precipitation, in fog, on days that were overcast with low cloud cover, or during any other circumstances that hampered visibility or audibility. Some survey events were discontinued if unfavorable weather conditions developed over the course of the survey.

Four survey transects were selected for fall 2005 and spring 2006 foraging surveys (Figures 7-34 and 7-35). Each was mapped and its length calculated using GPS. Transects were selected largely based on proximity to the project area, representative habitat for the area, and adequate access.





Mobile Radar Location

Stationary Radar Location

Foraging Migrant Survey Transect

Road

Project Area

Notes: *Base map: 24K USGS map courtesy MapTech; Road data courtesy of Maine Office of GIS*

1,000

Meters

Figure 7-34

Kibby Wind Power Project

A-Series Foraging Migrant Transects

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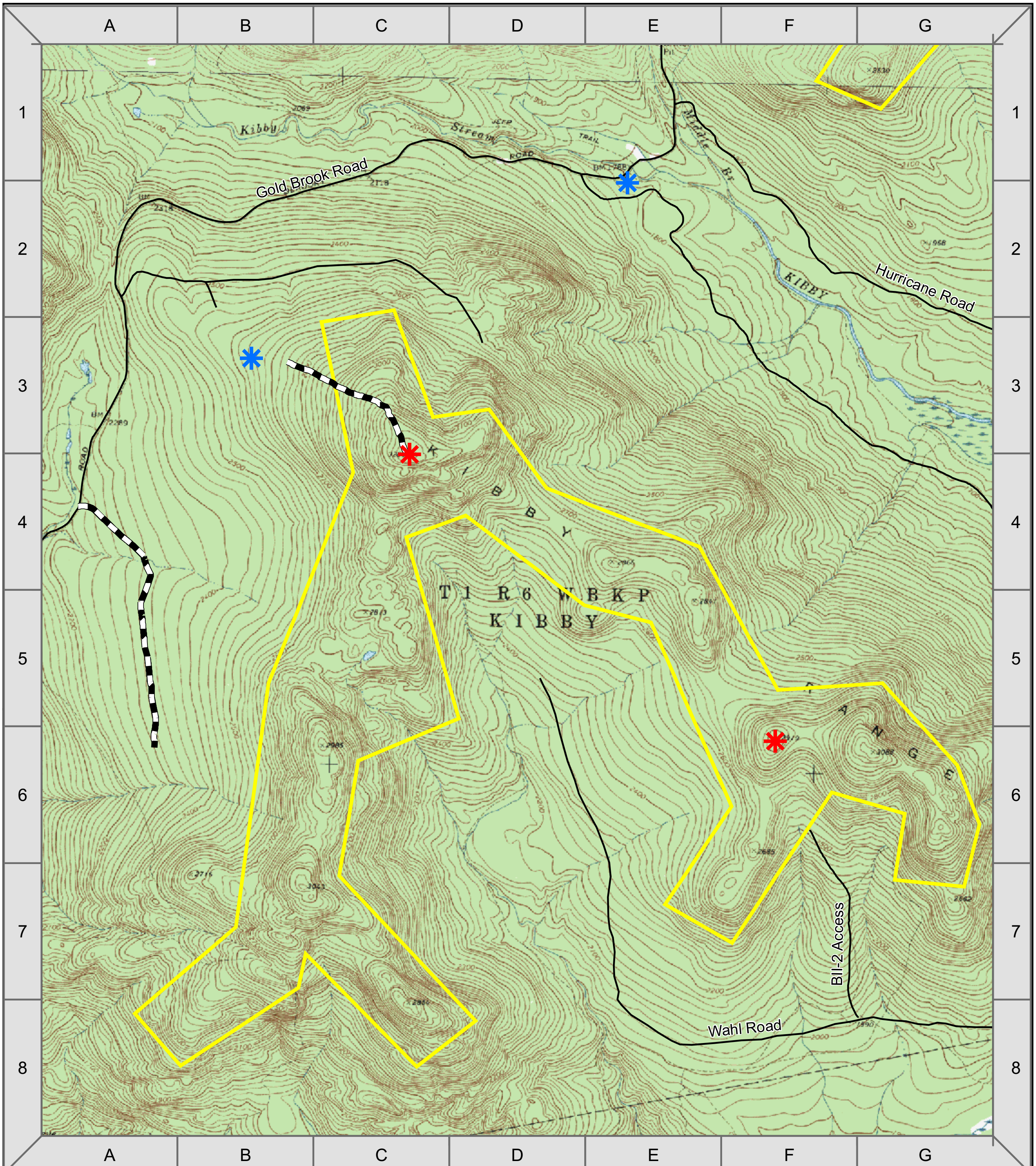

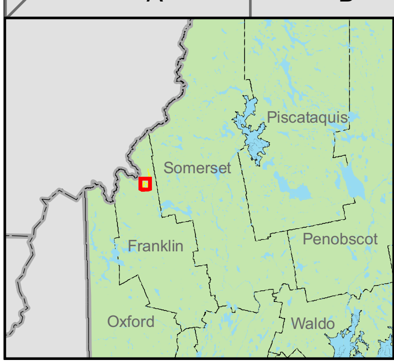

Mobile Radar Location

Stationary Radar Location

Foraging Migrant Survey Transect

Road

Project Area

Notes: *Base map: 24K USGS map courtesy MapTech; Road data courtesy of Maine Office of GIS*

1,000

Meters

Figure 7-35

Kibby Wind Power Project

B-Series Foraging Migrant Transects

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Two transects were located in valleys: one on the lower western slope of Kibby Range, and one on the lower western slope of Kibby Mountain. The Kibby Range valley transect was located along an abandoned logging road, between approximately 2,230 and 2,300 feet (680 and 701 m) in elevation. The Kibby Mountain valley transect was located along a jeep trail, between approximately 2,560 and 2,700 feet (780 and 823 m) elevation.

Two transects were located on ridges: one on the northern ridge of Kibby Range, and one on the central ridge of Kibby Mountain. The Kibby Range ridge transect was located along a trail to the summit, between approximately 2,700 and 3,200 feet (823 and 976 m) elevation. The Kibby Mountain ridge transect was located along the former fire tower access jeep trail, between approximately 3,140 and 3,654 feet (957 and 1,114 m) elevation.

Nine days of surveys were performed during the fall 2005 survey, seven in September and two in October. Twenty individual transects surveys were completed over these dates. For the spring 2006 survey, nine days of survey were conducted between May 4 and May 27. Twenty-one individual transect surveys were completed over these dates.

Survey Results

Relative Abundance of Species

A higher number of individual birds were observed in fall 2005 (852 individuals, as compared to 607 individuals in spring 2006). Fall observations represented 44 species, from 16 families. The most frequently observed species was the white-throated sparrow (*Zonotrichia albicollis*), with a relative abundance of 12.4 percent. The next most frequently observed species were golden-crowned kinglets (*Regulus satrapa*) (11.0 percent), black-capped chickadees (*Poecile atricapilla*) (9.5 percent), and yellow-rumped warblers (*Dendroica coronata*) (9.2 percent). In the spring 2006 survey, observations represented 46 species from 17 families. The most frequently observed species was the white-throated sparrow, with a relative abundance of 19.1 percent.

The next most frequently observed species were yellow-rumped warblers (11.4 percent), winter wrens (*Troglodytes troglodytes*) (10.9 percent), and dark-eyed juncos (*Junco hyemalis*) (9.4 percent).

The most abundant families observed are consistent between observations recorded in spring/fall 1994, fall 2005, and spring 2006 with sparrows and warblers topping the list. White-throated sparrows (a migratory species that potentially breeds in the project vicinity) were among the most commonly observed species in each of the studies. In spring 2006, yellow-rumped warblers moved up in relative abundance from fall observations to replace golden-crowned kinglets as the second most frequently recorded species. Also in spring 2006, winter wrens, which were not enumerated among the most frequent species during previous studies, comprised a top species in abundance. Meanwhile, chickadees and kinglets (which were among the most frequent species in previous fall studies) dropped off the spring list of the most frequently observed species; this is consistent with spring 1994 observations (ND&T 1994a, 1994b, 1995a, and 1995b).

No threatened or endangered species were identified during either the fall 2005 or spring 2006 surveys. However, one of the species identified during both surveys, the rusty blackbird, is listed as a “Species of Special Concern” in the state of Maine.

The distribution of species varies with site. Among all transects, Kibby Range valley had the largest number of avian families (14 total families in the fall, and 15 total families in the spring), while Kibby Mountain Ridge had the lowest (eight families in the fall, and nine in spring). Kibby Range Ridge supported 10 families in the fall and 13 in the spring, while Kibby Mountain Valley supported 11 families in both seasons.

Warblers (Parulids) were observed more frequently in the valleys than on their relative ridges, with comparatively more frequent observations in Kibby Range valley. Kinglets (Regulidae) were observed more frequently in Kibby Mountain valley than at other transects. Sparrows (Emberizidae), warblers, winter wrens (Troglodytidae), thrushes (Turdidae), vireos (Verionidae) and woodpeckers (Picidae) were all observed more frequently on the Kibby Range valley transect than in any other location.

The Shannon-Weiner diversity index found that the highest species diversity was observed within the Kibby Range Valley during both seasons. In the fall, this was followed by Kibby Mountain Valley, then Kibby Range Ridge. The lowest diversity index was observed on Kibby Mountain Ridge. In the spring, species diversity was successively lower for Kibby Range ridge, Kibby Mountain valley and Kibby Mountain ridge. Based on pooled analysis, it appears that the avian communities in valleys are more diverse and species rich than their ridge counterparts. A Mann-Whitney test, which compared valleys and ridges in general then each site individually to all others, showed that difference is statistically significant.

Temporal Use by Migrant Species

Many migratory species were observed during fall 2005 foraging bird surveys; however, the number of species observed, were generally dominated by members of four families. These include the sparrows, thrushes, kinglets, and warblers.

The presence of thrushes, although relatively infrequent in comparison to other migrant groups, was fairly consistent throughout the fall 2005 study (Figure 7-36). Warblers were present and relatively abundant throughout the fall 2005 season, with numbers peaking in mid-September. Numbers of warblers tapered somewhat in late September and were generally stable for the remainder of the season. Sparrows were relatively abundant throughout the fall 2005 season with a moderate peak in mid-September and a comparatively larger peak in early October. Kinglets were consistently abundant throughout the fall.

Many migratory species were observed during spring 2006 foraging bird surveys; however, they were generally dominated by members of three families (see Figure 7-37). These include the warblers (Parulidae), sparrows (Emberizidae), and wrens (Troglodytidae).

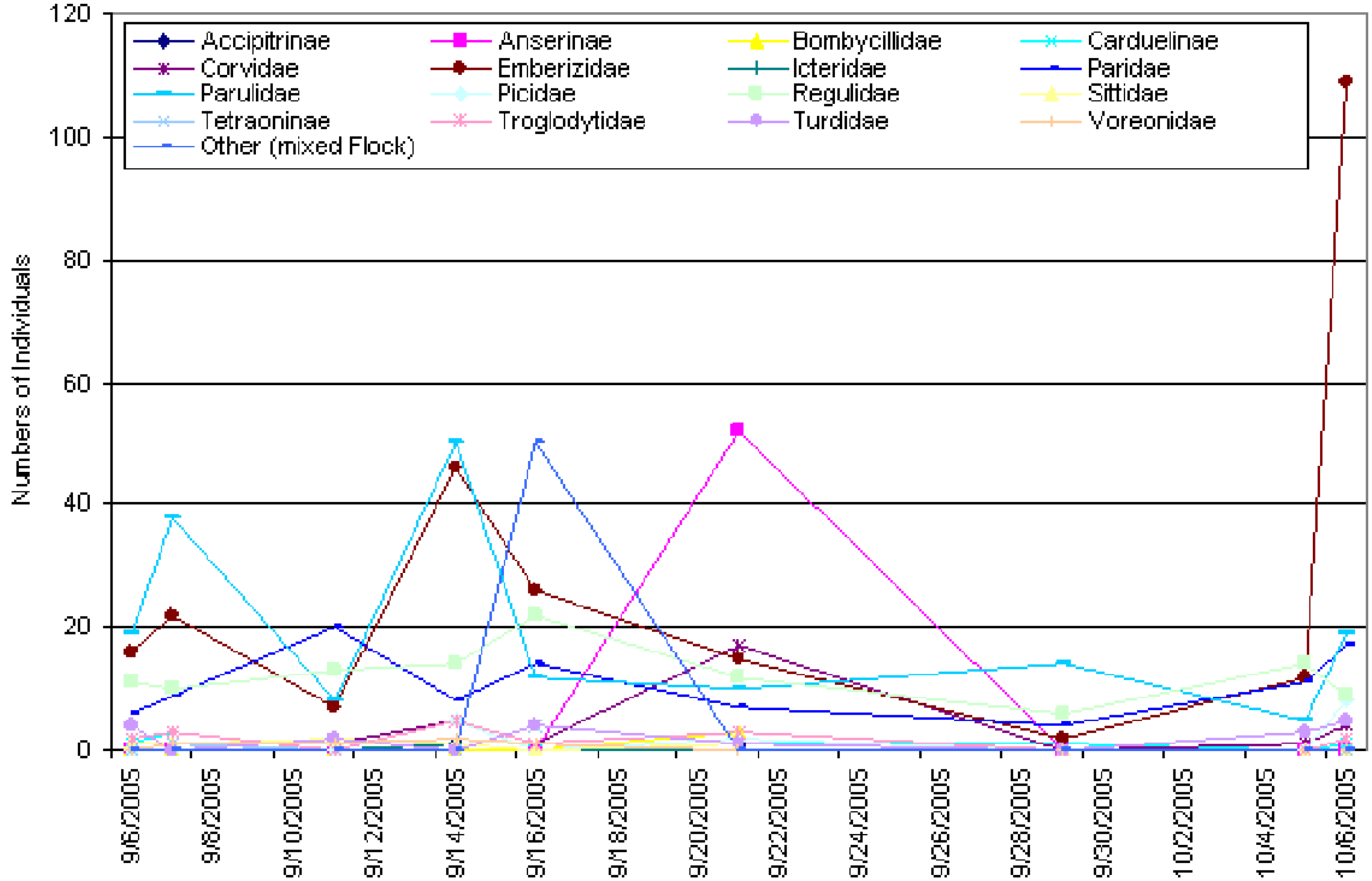

Figure 7-36

Kibby Wind Power Project

2005 Foraging Migrants

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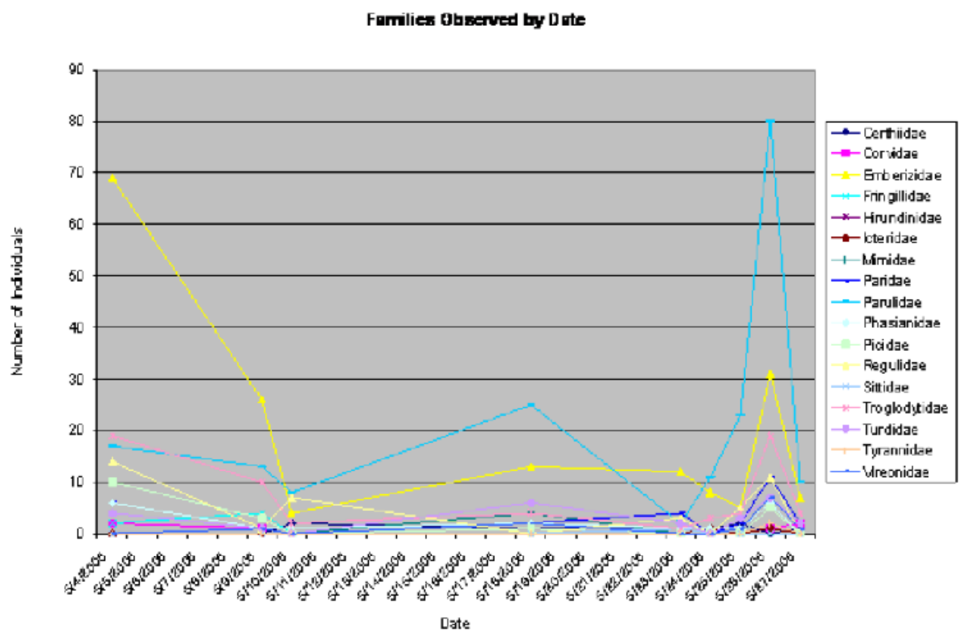

Figure 7-37

Kibby Wind Power Project

2006 Spring
Foraging Migrants

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