

KINGDOM COMMUNITY WIND, LOWELL, VT

Necessary Wildlife Habitat Assessment and Mapping For Black Bear and White-tailed Deer, and Winter Concentration Habitat for Moose

**Prepared By:
Multiple Resource Management, Inc.
Leicester, VT
March 3, 2010**

BACKGROUND

Necessary wildlife habitats as defined under Section 248(b)5 have been identified for both white-tailed deer and black bear. Necessary habitat for deer is limited to mature softwood shelter that provides relief from severe winter elements. Moose winter concentration areas, though not deemed decisive to the survival of the species, are similar to deer winter shelter but typically found at higher elevations and were assessed in this process. Such habitats for bears take three forms: forested wetland habitat providing spring/summer feeding and cooling habitat, corridor crossing areas providing linkage between habitat blocks through congested (developed) areas or open land lacking movement cover, and mature American beech stands exhibiting fall feeding behavior by bears through visible claw marks on the trees.

The habitat appraisal and mapping protocols were discussed with VT Department of Fish & Wildlife (VDFW) Biologist John Austin (April 28, 2009) and described in **Field Protocols for Necessary Wildlife Habitat Assessment and Mapping**, May, 2009. Field protocols were subsequently approved on May 29th at a meeting with Agency of Natural Resources personnel (Agency); progress was reviewed at another Agency meeting on September 9th and again with Mr. Austin on January 4, 2010. All habitat mapping was performed using mapping grade GPS equipment with differential correction (real-time or post-processed) of all GPS data for maximum accuracy.

The habitat under review is primarily portions of land owned by Moose Mountain Forestry and several additional adjoining property owners. These properties are collectively referred to as the Project Area.

HABITAT MAPPING & APPRAISAL - PROJECT AREA NECESSARY WILDLIFE HABITAT

A) Deer winter shelter

Methods

VDFW Significant Habitat maps were reviewed and shown to depict deer winter shelter (DWS) at the lower elevation along the east side of Route 100 in the vicinity of the project. The access road will first traverse an open meadow before crossing a narrow portion of the mapped DWS.

DWS is typically found below 2,000 feet msl, consists of mature softwood cover, recognizable by excessive hardwood browsing and accumulation of trails and pellet groups. Reconnaissance level search for these habitat characteristics which define DWS was conducted concurrently with bear habitat investigation.

Findings

The DWS depicted on the Significant Habitat maps (transposed to Exhibit 1) is presently under forest management through a Use Value Appraisal program developed for Moose Mountain Forestry holdings. This land has undergone various timber harvesting over the years. The softwood canopy is not particularly dense, offering limited shelter value; consequently, signs of significant winter use of the habitat were not found. Woody browse is going unused, and pellet groups and trail development were not readily apparent. The cover that exists at the project site is of marginal value at best, consequently, there will be no significant impact.

B) Moose Winter Concentration Areas

Methods

This habitat type resembles DWS but is typically found in much higher elevations. Searching for winter habitat characteristics was performed concurrently with bear habitat investigation.

Findings

Softwood cover at the top of the ridge lacked adequate crown density and canopy closure to provide winter shelter for moose, however, a young hemlock stand in much lower elevation on the southwest boundary line of the project area did exhibit early signs of moose winter concentration (Exhibit 1). The canopy of this stand is not particularly dense which is attributable to its immaturity (4" to 8" dbh). This block of habitat appears to be an expansion of more dense hemlock to the south, off of the project area, which likely represents the core of the shelter. As the hemlock stand on the project area matures and develops a more closed canopy, it will increase in value as a moose winter habitat.

C) Black Bear Habitat

a) Wetland Habitat

Methods

VHB Pioneer performed a wetland evaluation of the project development (direct investigation) area, and a cursory inventory of wetlands within ¼ mile of the project centerline (indirect investigation area). Multiple Resource Management, Inc. (MRM) reviewed the maps produced by Pioneer for wetland habitat suitability for black bears. Field signs of black bear use are not durable and must be recognized shortly after the bear's presence; field signs include grazing on herbaceous plants, tracks in the mud, digging of root tubers, scat deposits, etc. Initially, three visits to forested wetland habitats were planned between June and August in an effort to document viability of the habitat as well as feeding activity by black bears.

Findings

Numerous small wetlands were mapped throughout the study areas by VHB Pioneer (Exhibit 1). Individually, most of the wetlands are insignificantly small, however, collectively they do possess significant acreage to offer useful spring/summer habitat for black bears. Several small wetlands encountered while mapping BSB, both within the study areas of the access road and the turbine string, showed signs of black bear presence, either with tracks or scat. The most common and unmistakable sign of bear feeding was on Jack-in-the-pulpit root tubers and was common throughout the wetland sites.

The largest complex of wetlands that exhibited the greatest amount of bear use was in the vicinity of the beaver flowages. These flowages are surrounded by fringe wetlands within which grazing on the sedges and other herbaceous vegetation was visible and bear scat was quite prevalent. Though outside of the investigation areas, bear activity within wetlands were found farther west and down-slope of the beaver flowages on side hill seeps. Since bear activity was documented in the wetlands on the first visit, subsequent examination of wetlands was deemed unnecessary.

b) Corridor Crossings

Methods

Corridor crossings bridge habitat blocks that are separated by roads, homes, developments or open fields by providing cover to conceal animals moving through these bottlenecks. Known crossings have been documented via sightings or car collisions and are available through the VT Center for Geographic Information, Inc. Additionally, potential sites can be gleaned from orthophotography of the immediate environs.

Findings

The project access road fronts on VT Route 100 through an open meadow. Open meadows are found along both sides of the highway in this reach offering no concealment habitat for crossing the highway. Mink Farm Road, with numerous residences and open meadows, loops to the west of Rt 100 in the vicinity of the project access to Rt 100, further discouraging corridor movement of bears across Rt 100 at the project site.

One of the best indicators of corridor locations is automobile collision records, particularly where there are recurring incidences. Review of State GIS data shows a 1978 road kill of a bear on Rt 100 immediately west of the southern end of the turbine string at the Lowell/Eden town line. This is at the northern end of a reach of highway where contiguous forest cover is close to both sides of the road. Though not indicated by excessive collisions between bears and automobiles, the site characteristics suggest that the area may lend itself to bear crossing activity. This location is separated from the project by more than a mile, consequently the project will have no affect on bear movement through this reach.

To the north of the project access to Rt 100, open meadows continue along the highway and residential housing density increases as you get closer to the village of Lowell. Another road kill data point exists east of the project on VT Route 14 one mile north of the village of Albany. This occurred

in 1997 and is approximately 2.5 miles from the eastern edge of the project. The two closest sites where multiple road kills have happened are two miles north of Irasburg on Rt 14 (1997 and 2000; 7 miles from the project) and just south of the Orleans exit from Interstate 91 (1994 and 1998; 9.5 miles from the project). If corridor crossings exist at these locations, they will not be influenced by the project.

c) Bear Scarred Beech

Methods

Bear scarred beech trees (BSB) were mapped using different protocols for direct and indirect investigation areas: inclusive count of BSB within the direct investigation area of the project to provide a count of trees to be lost or avoided during construction; and a transect survey of BSB out to the ¼ mile extent of the indirect investigation area that can be accomplished while remaining on the project property.

BSB were mapped by uploading a geo-referenced configuration of the direct investigation area onto a Trimble Geo-XT receiver with remote hurricane antenna. This served as a field template to keep the researcher within the study area. The study area was traversed searching for BSB using the GPS tracking guide. All BSB were geo-referenced and marked with a yellow paint stick on the tree. All GPS readings underwent differential correction to optimize accuracy.

BSB mapping protocol within the indirect investigation area (from project development out to ¼ mile) involved transects paralleling the centerline connecting the turbine string. These transects were offset from and circumscribed the turbine centerline at intervals of 100m, 200m, 300m and 400m (Exhibit 1). The search area along each transect was a 20m wide swath within which all BSB were geo-referenced and marked with a yellow paint stick. This allows for BSB cluster locations to be interpolated. Through mutual agreement with VDFW, transects within the indirect investigation area associated with the access road were limited to 100m and 200m offsets from the access road centerline.

The outer transects extend off of the project area in certain locations, particularly on the eastern edge. Survey work was not conducted on the transect portions extending onto non-participating private property.

Upon completion of the direct and indirect investigation areas, a particular site of interest beyond these bounds but within the project area was surveyed. Extensive use by black bears of this habitat block located along the southwestern property line had been noted and warranted further investigation.

Findings

As final road and turbine string layout are still pending, a broad swath was established for direct habitat impact survey purposes (direct investigation area) within which the road and turbines would be placed (Exhibit 1). This resulted in a far broader search area than necessary to assess direct impacts, however, it allows for planning flexibility. This direct investigation area searched by MRM

(including extensions for stormwater control) totaled approximately 548 acres within which 539 BSB were located. The BSB began to show up in clusters approximately half way up the proposed access road. Along the ridgeline, BSB were in distinct clusters as dictated primarily by the cover type. Much of the ridgetop is softwood whereas the BSB were restricted to the northern hardwood cover type.

Polygons were drawn around clusters of BSB as done by MRM in the analyses of BSB impact at two previously proposed wind projects (Deerfield docket #7250; Sheffield docket #7156). Eight polygonal clusters of BSB were designated using the mapped location of BSB within the direct investigation area and interpolating out through the mapped BSB in the transect swaths of the indirect investigation area (Exhibit 1). These polygons range in size from 0.7 acre to 30.5 acres. These polygons have further been shaded to depict the portion of the polygon that overlaps with the potential direct investigation area within which the project road and turbine string will be laid out, approximately 70 acres. This by no means implies that 70 acres of BSB will be lost but rather depicts the areas within which project layout will have to avoid BSB where engineeringly feasible.

A stand of American beech was found in a southwest property corner that was of adequate density to warrant additional scrutiny even though the site was beyond direct and indirect investigation areas. Though BSB mapping continues in this area, more than a thousand BSB have been mapped with many of the stems having been utilized within the last three years.

DISCUSSION – PROJECT AREA NECESSARY WILDLIFE HABITAT

A) White-tailed Deer

The predominant cover type of the mapped winter shelter traversed by the access road is balsam fir, red spruce and white pine. Deer winter shelters are dynamic ecosystems and, when comprised of species which are relatively short lived, they can deteriorate in value over time. This winter shelter was first mapped in 1988 which in all likelihood was its prime. Extensive logging has occurred under previous ownership but the property is now under professional forest management through the Use Value Appraisal program. Because of the present poor condition of the habitat and lack of deer winter activity, the project will not destroy or significantly imperil the deer winter shelter.

B) Moose

Moose winter concentration areas are not classified as necessary wildlife habitat as defined in the regulatory process. They are of interest and for that reason it has been identified and mapped on the project area. The heart of the area appears to exist on non-participating private property to the south and is creeping north onto the project lands through forest succession. The portion of the moose concentration area on the project land is young and of marginal value but should increase in value with maturity. This habitat is well outside any impact zone of the project and will not be impaired in any way by the project.

C) **Black Bear**

a) Wetland Habitat

The project layout will avoid most of the numerous small wetlands that are spread across the project area which, in aggregate, offer functional habitat. Of greatest value are the large fringe wetlands associated with the beaver flowages and adjacent seep areas. These areas are located along the southwestern property line and well outside of any impact from the project.

b) Corridor Crossings

The point of access of the project to Rt 100 would be the only potential point of conflict between the project and this form of necessary wildlife habitat. Habitat characteristics, however, suggest that this location is not likely to be a corridor crossing area. The most likely point of connectivity between the large blocks of forested habitats on the east and west sides of Rt 100 is south of the project near the Eden town line where forest cover is in close proximity to both sides of the highway. Ample data exists from the Searsburg wind project in southern VT to demonstrate that bears are not averse to crossing between or feeding near the turbines. Technology has changed dramatically since the Searsburg project was built more than a decade ago. Then, the turbines were small and situated close together; despite this, bears frequently pass through the project. With today's larger units, it is not uncommon to have a thousand feet or more separation between turbines which will provide more extensive cover for moving and feeding.

c) Beech Habitat

It would be rare to find a northern hardwood ridge line in Vermont that did not contain bear scarred beech. American beech is becoming more prominent, especially where the moose population is thriving, since beech is not a favored browse species of moose. Approximately 70 acres of BSB habitat has been identified within the potential construction area. This, however, is within a search area that varies in width from 250 feet to more than 1,500 feet. As the access road and turbine connector road will be less than 50 feet wide, judicious planning and layout can avoid much of these 70 acres of BSB habitat. A large stand of BSB more dense than the demarked polygons will remain unimpeded by the project.

ELECTRICAL INTERCONNECT

The collector line coming from the project area will join an existing distribution line on Route 100 and be rebuilt as a transmission line with the distribution lines under built on the same poles. The rebuilt line will follow Route 100 north to the Lowell Substation located northeast of the intersection of Route 100 and Route 58. From the Lowell substation north to the Jay #17 substation, the existing transmission and distribution under build line will be rebuilt largely in the existing right of way or relocated closer to route 100. From the Jay #17 substation the transmission line will be built in an existing distribution right of way from the substation to the intersection of Cross Road and Route 105, where it connects to the existing VELCO 46 kV line. The VELCO line will be reconducted from this intersection to the VEC Jay

Tap switching station. Because of the lines preexistence, proximity to human inhabitation, public roads, low elevation and open meadows, no adverse impact will be felt on black bear or moose habitat.

Where the transmission and distribution lines require a rebuild to accommodate the larger capacity of the transmission line, the rebuilt lines will primarily utilize the existing corridor, however, there are sections where the line will be relocated closer to Route 100. The increased capacity of the transmission line will require an increase in height of the utility poles (up to 20'). This configuration will likely require right-of-way expansion from its present width (as narrow as 30 feet in certain places) to up to 100 feet in width in some locations. As the existing utility line follows in close proximity to town roads along much of its route, the added width will be realized on only one side of the power line where adjacent to town roads.

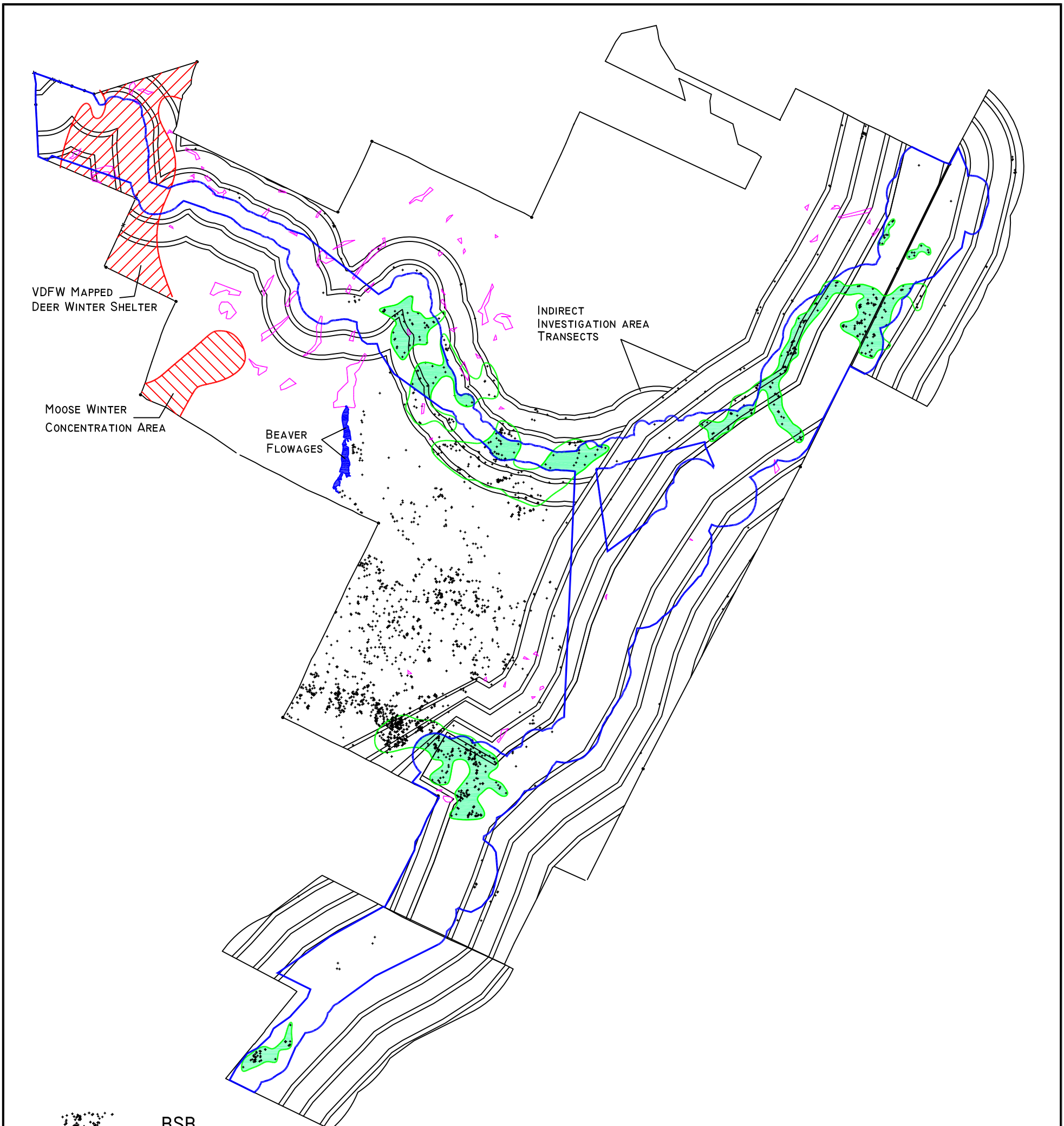
Deer winter shelter (DWS) has been mapped by the VDFW along the east side of Route 100 from the project site to the village of Lowell, and from Route 58 to just south of the Westfield town line. This mapped habitat is not affected, even with the expanded right-of-way width, because it is separated from the edge of Route 100 (and, hence, the distribution line following Route 100) by open meadows. On the west side of Route 100, the power line is located between the highway and a previously mapped DWS just north of Lowell village and immediately south of Pope Road for a distance of approximately 2,000 feet. This DWS was first mapped in 1973, consequently, its viability as a DWS will depend on the tree species composition. Current use of the site by deer in the winter will be examined and avoidance recommendations provided to the utility if necessary.


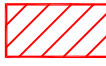





The power line passes along the edge of several patches of softwood cover not mapped as deer winter shelter between the villages of Lowell and Jay. One edge of the right-of-way may expand into these softwood patches by as much as 35 feet. Though they have not been identified as necessary wildlife habitats, these patches of softwood will be examined for deer winter use. Should deer winter activity be found, DWS habitat management recommendations on least impact (involving both habitat avoidance and enhancement) will be provided to the utility.

CONCLUSION & RECOMMENDATIONS

Though much of the potential BSB impact can be avoided, total avoidance is unrealistic. Adequate resources, however, exist on-site to allow for proper and reasonable mitigation to the extent necessary to address any habitat that may be destroyed or significantly imperiled. It is recommended that BSB habitat mitigation be pursued, if deemed necessary, using habitat within the project area that is beyond development impact.

It is not anticipated that the electrical interconnect will have an adverse impact on DWS. However, should deer winter activity be found, DWS habitat management recommendations on least impact (involving both habitat avoidance and enhancement) will be provided to the utility.



-  BSB
-  VDFW MAPPED DEER WINTER SHELTER
-  MOOSE WINTER CONCENTRATION
-  BEAR SCARRED BEECH (BSB) CLUSTERS
-  BSB WITHIN DIRECT INVESTIGATION AREA (70 AC)
-  DIRECT INVESTIGATION AREA (548 AC)
-  WETLANDS

KINGDOM COMMUNITY WIND
LOWELL, VERMONT

NECESSARY WILDLIFE HABITATS

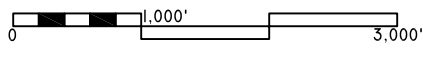


EXHIBIT I