7.0 NATURAL RESOURCES

7.1 Introduction

The natural resources of the project area and vicinity have been extensively studied and documented through the development stage of this project, as well as through earlier studies performed in support of the licensing of the former Kenetech project. TransCanada's consultants have conducted rare plants surveys, vernal pool surveys, wetlands delineations, avian and bat surveys, a winter track survey (for Canada lynx), and a habitat survey for other mammals of concern, in addition to general field studies to characterize the overall resources of the project area. TransCanada is engaged in ongoing consultations with applicable state and federal resource agencies to ensure that resources of concern have been identified and appropriate studies conducted according to acceptable protocols. TransCanada's studies, when combined with those conducted over a decade earlier by Kenetech, provide a comprehensive, long-term assessment of the specific natural resources in the project area.

This assessment has formed the basis for the detailed project design work, allowing not only an identification of potential project impacts, but development of avoidance strategies resulting in a minimization of those impacts, as well as design of appropriate mitigation measures where impacts are unavoidable. Note that as sensitive natural features have been identified through the course of project field efforts, the project design has been adjusted to avoid impacts to such areas to the greatest extent possible.

This discussion provides a description of the existing natural resources in the project area and review of potential construction and operation impacts.

7.2 Vegetative Communities

7.2.1 Existing Conditions

The proposed Kibby Wind Power Project is located in the Boundary Mountains of western Maine, within the Western Mountains Biophysical Region, which borders northern New Hampshire and Quebec, Canada (see Figure 2-4). The entire region is generally undeveloped and dominated by working industrial forest and mountainous landscape.

The Western Mountains Biophysical Region is best characterized by its rugged topography, cool climate, low annual precipitation, and high snowfall. The average maximum temperature in July is approximately 75ºF (24ºC), which is lower than any other part of the state except the Eastern Coastal Region. The average minimum temperature in January is -1ºF (-18ºC), comparable to that of northern Maine. The average annual precipitation in this region is low, at approximately 39 inches (99 cm), although this varies with elevation and aspect. Due to the rain shadow effect that mountains and mountain ranges produce, windward slopes may receive up to 50 inches (127 cm) of annual precipitation while leeward slopes may receive less than 35 inches (89 cm) (McMahon 1990).

Kibby Mountain is one of the tallest mountains in the area at 3,658 feet (1,115 m). Kibby Range is one of the largest of the mountains in terms of area and number of peaks included along its ridgeline, with several peaks that are approximately 3,002 to 3,281 feet (915 m to 1,000 m) high. The valley bottoms in the project area average between 2,133 and 2,461 feet (650 m and 750 m) in elevation. Gold Brook drains the southwestern portion of the project area southward, to the North Branch of the Dead River. Kibby Stream and Spencer Stream drain the central, eastern, and northern parts of the project area eastward, to the Dead River. The headwaters of the Moose River are located just north of the project area.

Vegetation in the project area consists primarily of mixed softwoods and northern hardwoods in the valleys, and spruce-fir on the summits. Aerial photographs were used to preliminarily identify the cover types and potential natural communities. Subsequent field activities in 2005 and 2006 included traveling along each ridgeline, road corridor, and transmission inter-tie corridor to identify and characterize natural communities and other natural resources, including wetlands. Notes on the dominant plants, tree heights, hydrology, signs of wildlife use, and physical characteristics were recorded. Photos were taken to document typical habitat characteristics and to illustrate important natural community and wetland features.

A natural community is defined by Gawler and Cutko (2004) as an assemblage of interacting plants and animals and their common environment, recurring across the landscape, in which the effects of recent human intervention are minimal. Notably, the project area is located within a working forest. Virtually all of the project area has been influenced by past timber harvesting activities. Lands below 2,700 feet (823 m) elevation are currently subject to forest management activities, while much of the higher elevations in the project area were heavily cut prior to the inception of P-MA zoning. Cut stumps and abandoned logging roads and trails are evident in many areas in the P-MA on Kibby Range and Kibby Mountain. This activity has ultimately affected the composition of the forest, particularly by reducing the amount of mature spruce stands in the area and by converting large areas of mature forest to younger stands. Also during the 1970s, many stands of western and northern Maine forests were severely affected by spruce budworm outbreaks. Consequently, the area's dominant forest types are in a variety of different ages and species composition. Some natural communities do exist, but they are typically isolated patches within stands of regenerating forest. For this reason, the natural communities that are present are typically not in good condition.

For the above reasons, potential natural communities present in the project area's disturbed and early-successional stands have been characterized using MNAP's most recent classification system (Gawler and Cutko 2004). These classifications were made by assessing the presence of later-successional tree species present, by the understory, and by other site characteristics, such as elevation and landscape position. In some cases, potential natural communities are not readily assignable due to recent or active timber harvesting: in these cases, areas have been identified as "regenerating forest". Following are descriptions of natural communities and wetland types found in the project area.

Natural communities and potential natural communities found in the project area include the Beech-Birch-Maple Forest; Spruce-Northern Hardwoods Forest; Spruce-Fir-Wood Sorrel-Feathermoss Forest; and Fir-Heartleaved Birch Subalpine Forest found in the highest elevation areas of the project (> 3,000 feet [915 m]). All four of these communities occur within the Spruce-Fir-Northern Hardwoods Forest Ecosystem of Maine (Gawler and Cutko 2004).

7.2.1.1 Beech-Birch-Maple Forest

Beech-birch-maple forests were originally included under a broader classification called Northern Hardwood Forest (MNAP 1991). Beech-birch-maple forests are most common at elevations below 2,300 feet (701 m) around the bases of the mountains, on the lower valley side slopes, and on higher, protected slopes. In the project area, this community is mostly found along the transmission line corridor. This hardwood forest type also occurs in strips and patches in protected basins and stream valleys between 2,300 to 2,700 feet (701 to 823 m), but is not very common at higher elevations. One such patch is found in a sheltered area on the south west side of Kibby Range between approximately 2,500 feet (762 m) and 2,600 feet (793 m) in elevation.

Dominant canopy trees in this community include sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), and yellow birch (*Betula alleghaniensis*). Striped maple (*Acer pensylvanicum*) is a dominant sub-canopy and shrub species. Hobblebush (*Viburnum lantanoides*), mountain maple (*Acer spicatum*), and red-berried elder (*Sambucus racemosa*) are also common shrubs. The herb layer is typically dominated by partridgeberry (*Mitchella repens*), wood fern (*Dryopteris intermedia*), bracken fern (*Pteridium* spp.), bluebead lily (*Clintonia borealis*), northern wood-sorrel (*Oxalis montana*), and whorled aster (*Aster acuminatus*). As elevation increases, balsam fir (*Abies balsamea*) becomes a more common component of this community type (Figure 7-1).

Many of the beech-birch-maple stands of the project area have been affected by harvesting activities. Where harvesting has occurred, these usually shaded forests contain relatively open canopies that in turn tend to support species not commonly associated with mature hardwood forests, including willows (*Salix* spp.), red raspberry (*Rubus idaeus*) and a wide array of herbaceous species.

7.2.1.2 Spruce-Northern Hardwood Forest

Spruce-northern hardwood forest (Figure 7-2) is the transitional natural community between the lower elevation beech-birch-maple forest and higher elevation softwood-dominated communities. It is believed that many of the regenerating conifer areas at elevations mainly below 2,700 feet were once spruce-northern hardwood forest. Where this community is still intact, the canopy is a mixture between hardwood (birch, beech, and maple) and softwood (mainly spruce) species with a variety of shrub and herb species. In the project area, this community is mostly found from 2,700 feet (823 m) up to 2,900 feet (884 m), in areas that have not been recently harvested.

Figure 7-1: Photograph of Beech-Birch-Maple Forest

Figure 7-2: Photograph of Spruce-Northern Hardwood Forest

7.2.1.3 Spruce-Fir-Mountain Sorrel-Feathermoss Forest

Spruce-fir-mountain sorrel-feathermoss forest (Figure 7-3) is a very common natural community in Maine. It occurs on the side slopes of the mountains, and reaches elevations of approximately 3,000 feet (915 m) in the project area. These forests typically have a closed canopy with red spruce (*Picea rubens*) being dominant and balsam fir being common. From 2,900 feet (884 m) and up it tends to include a larger component of balsam fir, heart-leaved paper birch and mountain ash as it becomes fir-heartleaved birch subalpine forest. The understory is sparse and contains conifer litter, mosses and occasional northern forest herbs such as Canada dogwood (*Cornus candadensis*), common wood-sorrel, bluebead lily, and gold thread (*Coptis groenlandica*). These forests usually occur on very acidic soils (Gawler and Cutko 2004). This community was formerly included within a much broader classification, Subalpine Spruce-Fir Forest, in the 1991 MNAP classification (MNAP 1991).

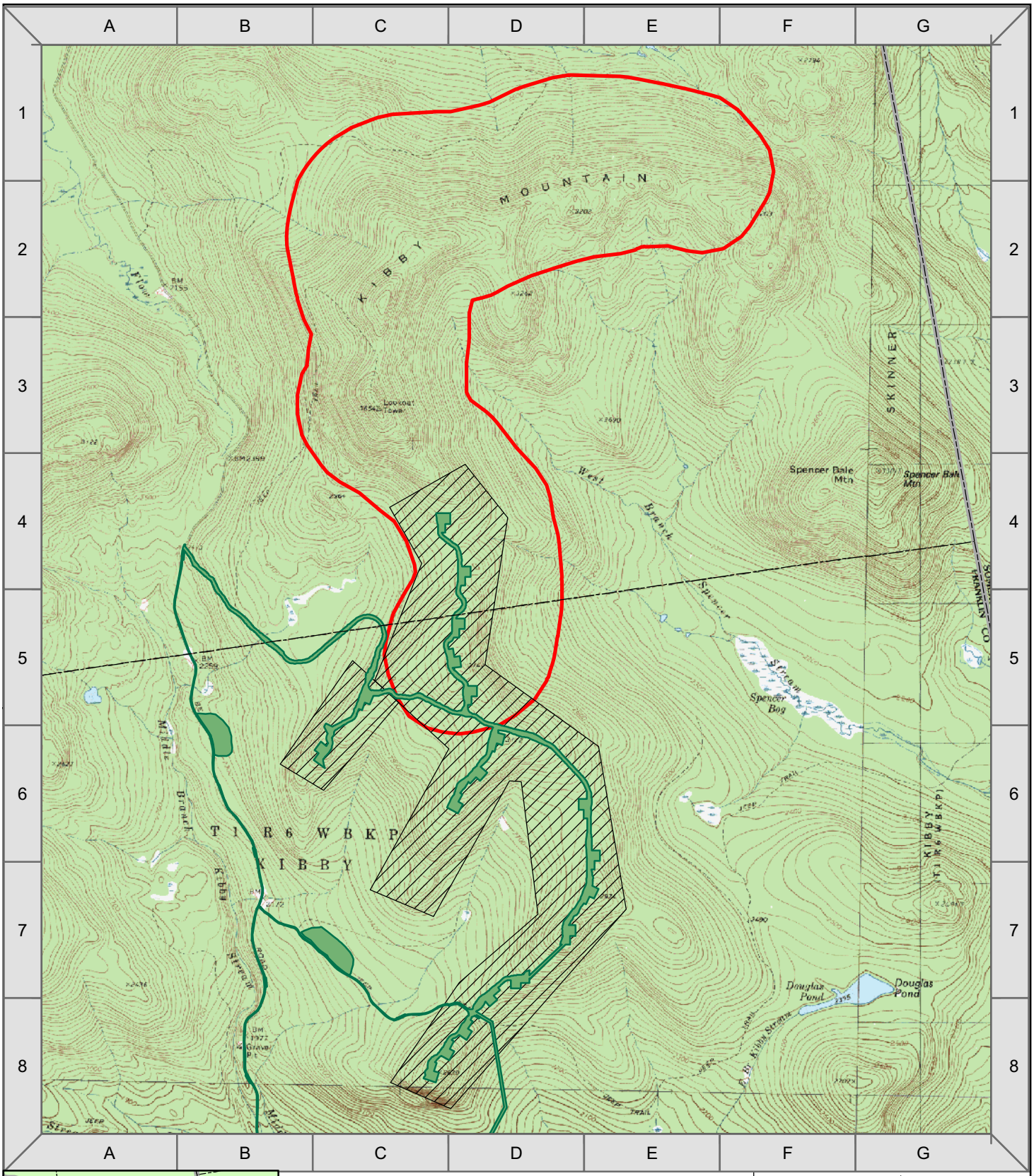
7.2.1.4 Fir-Heartleaved Birch Subalpine Forest

Fir-heartleaved birch subalpine forest (Figure 7-4) is the dominant forest type of the peak and ridgeline areas above 3,000 feet (915 m). It also was formerly included in the broader 1991 Subalpine Spruce-Fir Forest classification (MNAP 1991). However, since it is a more unique example of high elevation forests within Maine, it has since been identified as a separate community type. This community has an S3 state ranking which is defined as a rare community in the state with roughly 20 to 100 occurrences statewide (Gawler and Cutko 2004). In western Maine; however, it is relatively common, and is found on many of the ridges that are higher than 3,000 feet (915 m) in elevation. The S3 ranking, therefore, is more of an indication of the relative rarity within Maine of the ecological conditions that foster the development of this community – namely, high elevations and a cold climate. These conditions promote the development of this forest community, and limit the existence of most other northern forest plant species.

Fir-heartleaved birch subalpine forests in the project area occur on the highest parts of Kibby Mountain (see Figure 7-5). There is an area where a stand of balsam fir and heartleaved birch occurs on the highest part of Kibby Range, but it is small in extent and has not been mapped as this community. Balsam fir and heartleaved paper birch (*Betula papyfera* var. *cordifolia*) are the common canopy species, although red spruce and mountain ash (*Sorbus* spp.) also commonly occur. Canopy heights of this forest type increase as elevation decreases. In the highest parts of the project area on both mountains, the canopy height is generally less than 40 feet (12 m) tall and the ground layer is often covered by a low-uniform layer of mosses. Outside of the project area, on the higher peaks in the area (such as the summits of Kibby Mountain and Caribou Mountain), wind damage is often evident in the form of blowdowns and broken tree tops. This phenomenon only occurs within the project area in a few small patches. On lower ridgeline Kibby Mountain areas and more protected lower slopes around 3,000 feet (915 m) in elevation, which typifies the project area, wind damage is less severe to non-existent and tree heights average 40 to 50 feet (12 to 15 m).

Figure 7-3: Photograph of Spruce-Fir-Mountain Sorrel-Feathermoss Forest

Figure 7-4: Photograph of Fir-Heartleaved Birch Subalpine Forest



Legend

- State Boundary
- County Boundary
- Town Boundary
- Kibby Wind Power Project Area
- Area to be Rezoned
- Sub Alpine Fir Forest

Notes: Base Map: 24K USGS Topographic Map

1

Miles

Figure 7-5

Kibby Wind Power Project

MNAP Identified Fir-heartleaved Birch Subalpine Forest

S:\Projects\10654-Kibby\OUTPUT\PDF\Reports\Section7\Skinner_track_rds_fig7-16_8x11_122906.pdf

Understory development varies in this community, depending on canopy characteristics. Where the canopy is broken, such as within blowdowns, herbs, shrubs and regenerating canopy trees are found and dominant plants include balsam fir, mountain ash, heartleaved paper birch, red raspberry, wood ferns (*Dryopteris campyloptera* and *Dryopteris intermedia*), large-leaved goldenrod (*Solidago macrophylla*), whorled aster, and wild sarsaparilla (*Aralia nudicaulis*) (Figure 7-6). Where the canopy is complete, understory development is sparse and often limited only to carpets of forest mosses, particularly red-stemmed moss and hairy-cap moss, with occasional goldthread, bunchberry and northern wood-sorrel.

Fir waves are an unusual expression of this community (Gawler and Cutko 2004) and were not observed in the project area.

7.2.1.5 Regenerating Forest Stands

Young, regenerating forest stands occur throughout the project area and are common up to 2,700 feet (823 m) in elevation. These include clearcuts that are being actively managed to promote softwood growth. Some areas are well to over-stocked with fir and spruce regeneration ranging from 3 to 15 feet (1 to 5 m) in height, though very recent clearcuts frequently have little vegetation at all. Many of these regenerating forests have recently been thinned (pre-commercial). Other areas on lower slopes have been selectively cut. Many of these lower slope areas have a thick regeneration of hardwood. A large proportion of the cut areas have been harvested in the last 12 years (see Figures 7-7 and 7-8).

Above 2,700 feet, forest stands within the project area are typically in later stages of regeneration; in some areas, however, stands within the P-MA zones are approaching maturity, or are mature. The condition of forests in the P-MA zone is largely dependant on the extent and timing of forestry impacts prior to the inception of P-MA zoning, as well as the occurrence of natural events, such as spruce budworm infestations and blowdowns.

7.2.1.6 Wetlands

Details with regard to wetlands and streams found in the project area are provided in Section 8.5. The following sections generally describe the major wetland cover types (forested, scrub-shrub, and emergent) that occur in the proposed project area.

Forested Wetlands

Forested wetlands are characterized by woody vegetation that is at least 20 feet (6 m) tall (Cowardin et al. 1979). Forested wetlands comprise 37 percent of the total number of wetlands within the proposed project area. Most of these are classified as broad-leaved deciduous and/or needle-leaved evergreen forested wetlands (see Figure 7-9).

Figure 7-6: Photograph of an Opening in Fir-Heartleaved Birch Forest

Figure 7-7: Photograph of a Representative Cut Area

Figure 7-8: Photograph of a Representative Cut Area

Figure 7-9: Photograph of a Forested Wetland

Scrub-Shrub Wetlands

Scrub-shrub wetlands are characterized by woody vegetation less than 20 feet (6 m) tall (Cowardin et al. 1979). These areas are typically dominated by shrubs and young trees, but may also include older trees that are stunted due to environmental conditions. Scrub-shrub wetlands within the proposed project area occur as three general types: scrub-shrub wetlands associated with seeps or small streams; scrub-shrub wetlands associated with large streams; or scrub-shrub wetlands that are in early-successional stages due to recent tree harvesting. Approximately 34 percent of the total number of wetlands within the proposed project area consist of the scrub-shrub wetland cover type.

Scrub-shrub wetlands are structurally similar to early successional habitats. However, they generally have a greater diversity and abundance of wildlife species due to the seasonal presence of water (see Figure 7-10).

Emergent Wetlands

Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens (Cowardin et al. 1979). Emergent wetlands include areas commonly referred to as marshes and wet meadows. The project area encompasses only a few areas that could be classified solely as emergent wetlands because they are often intermixed with scrub-shrub wetlands. Most of the emergent wetlands found in the project area are found in narrow openings in the forest canopy, and are classified as emergent because the wetland area is dominated by herbaceous vegetation. Approximately 29 percent of the total number of wetlands within the proposed project area consists of emergent wetlands (see Figure 7-11).

7.2.2 Potential Impacts to Vegetative Communities

Construction of the proposed project will result in direct impacts within the discrete footprint of construction activities and permanent facilities: these impacts are discussed in Section 7.2.2.1. The presence of permanent facilities may incur potential indirect impacts, such as invasive species infiltration, habitat conversion, forest fragmentation and edge effects. These potential indirect impacts and their possible effects on wildlife are discussed in Sections 7.2.2.3 through 7.2.2.5.

7.2.2.1 Direct Construction Impacts

As discussed in Section 2.4 (and shown in Figure 2-5), approximately 443 acres of land will be disturbed during construction of the proposed project. Only 97 acres of this area will be subject to permanent impacts. Table 7-1 lists the acreage, by project feature, that will be impacted by the construction and final footprint of the Kibby Wind Power Project. These estimates include clearing for: turbines and access roads; existing road improvements; rock crusher and temporary material storage areas; equipment and component laydown areas; a concrete batch plant and material handling/storage area; a construction control center and parking; the 34.5 kV collector system corridor; a substation, and; a service building. Of the areas subject to

Figure 7-10: Photograph of a Scrub-Shrub Wetland

Figure 7-11:Photograph of an Emergent Wetland

construction impacts, only those for turbines and access roads, existing road improvements, the substation, and the service building will constitute a permanent loss of existing habitat. All other habitat alteration will be temporary, or will entail transformation from forested habitats to shrub and low forest habitats, such as associated with clearing for the transmission right-of-way. It should be noted that many of these areas below 2,700 feet have been recently harvested and are currently in early successional stages. A description of each project feature and the potential impacts from each is found in the following subsections.

Table 7-1: Direct Habitat Losses by Project Feature

Project Feature	Construction Acreage	Permanent Acreage
Series A turbines and roads	100	18
Series B turbines and roads	228	36
Series B construction egress road	1	1
34.5 kV collector system	29	10
Kibby Substation	3	3
Service building	1	1
Construction control center	1	0
Concrete batch plant and raw material stockpile	3	0
Rock crusher and temporary material storage areas	29	0
A and B ridge laydown areas	18	0
Gold Brook Road improvements	15	15
Gold Brook Road pull-off areas	2	0
Wahl Road improvements	10	10
Spencer Bale Road improvements	3	3
Total	***443***	***97***

Turbine Clearings

The turbine and laydown areas will be cleared of trees and grading may be required around the turbine foundations. Construction of the turbine foundations and the pads for the transformers will result in a direct loss of habitat, though each of these areas is relatively small and contiguous with the turbine access road. Clearing for the the turbine openings will also result in an indirect impact in the form of habitat conversion from a mature forest to a regenerating forest. These areas will be allowed to naturally re-vegetate.

Access Roads

Impacts from the construction of access roads will include direct loss of habitat. Approximately 71.5 acres of habitat loss will occur from the construction of new roads, which will total 17.4 miles in length. Direct impacts from road construction have been minimized to the extent practicable. For example, necessary road width has been thoroughly scrutinized, and will be no greater than necessary.

The existing network of active and inactive logging roads in the area have been used as much as possible for access to the project area ridgelines. New roads have been designed based on detailed consideration of field data such as the location wetlands, streams, wildlife habitat, bedrock outcrops, and very steep slopes.

Transmission Inter-ties

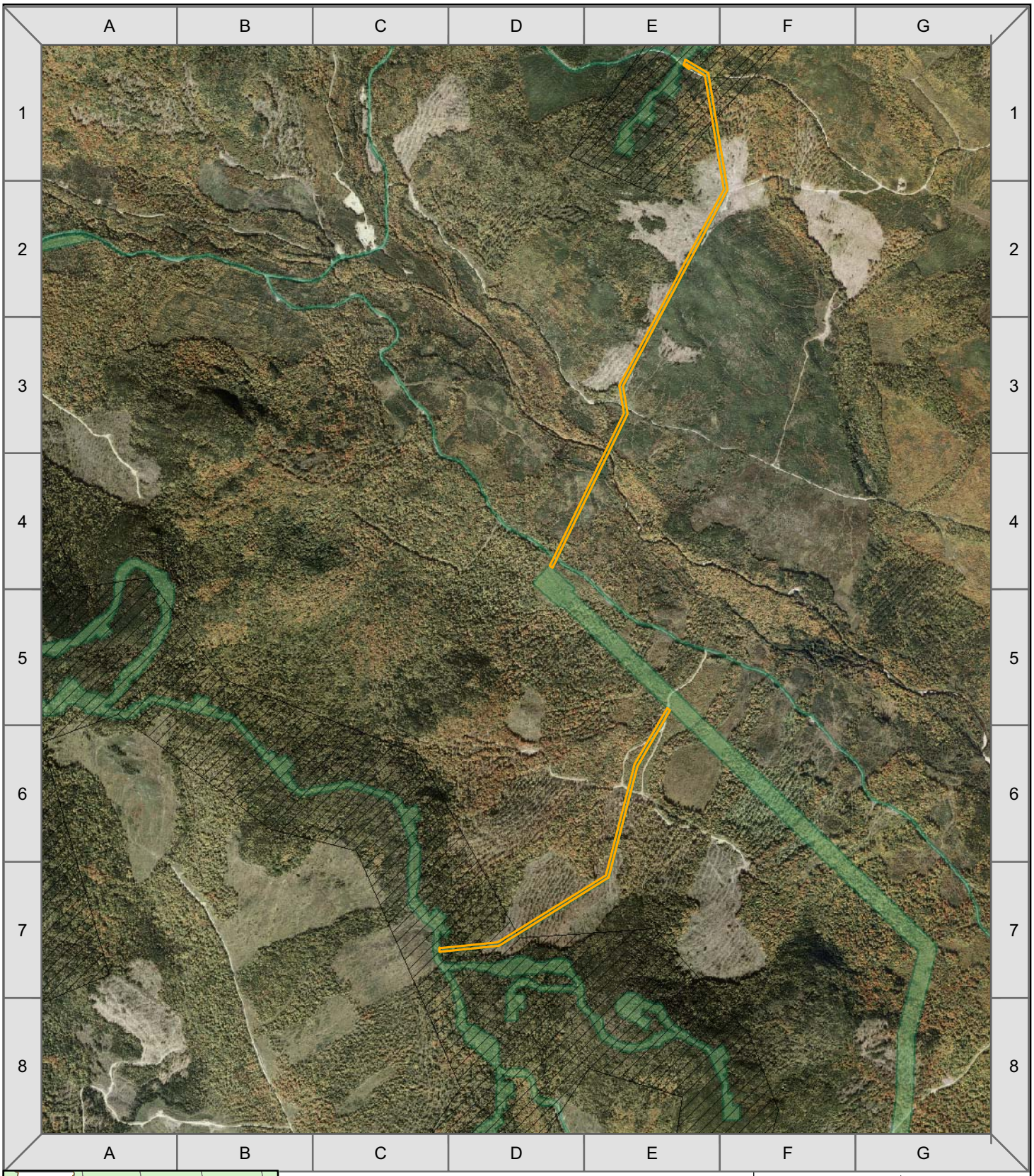
The proposed collector line corridors will be cleared of trees where necessary. After construction, the corridors will be allowed to revegetate; shrubs and low trees will be allowed to establish to a height of approximately 10 feet (4.6 m). The corridor will become dominated by shrubs and a variety of broad- and narrow-leaved herbaceous vegetation as is typical of transmission ROWs. Vegetation along the corridor will be trimmed or maintained every 4-6 years.

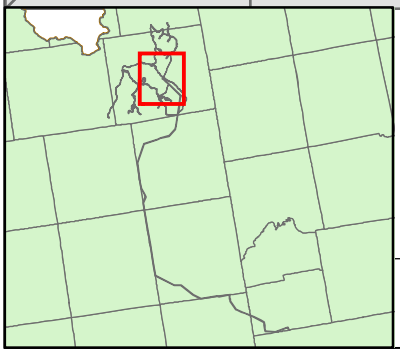
As with the entire project, the collection system corridors were designed to avoid wetlands to the extent possible. Wetland avoidance has resulted in only clearing impacts to wetlands from clearing along the collector line routes. No filling of wetlands will be required for the collector lines. Section 8.5 discusses project wetland impact in more detail.

Each collection system corridor crosses three streams, one perennial and two intermittent (Figure 7-12). The inter-tie from Kibby Mountain crosses Kibby Stream (an approximately 30 to 50 foot [9 to 15 m] span) and two intermittent channels that are its tributaries (each about a 1 to 3 foot [0.3 to 0.9 m] span); the inter-tie from Kibby Range crosses a small perennial unnamed tributary to Kibby Stream (an approximately 5 foot [1.5 m] span) and two intermittent tributary channels (each approximately a 3 to 4 foot [0.9 to 1.2 m] span). The crossing location for Kibby Stream was chosen where there was very little floodplain wetland associated with the stream and where the stream channel was located in a narrow area with no braiding, as found in other nearby areas of the stream valley. These crossings will allow pole placements well above the streams so woody riparian vegetation can be maintained to the maximum extent practical. This will help to provide continued shade to the streams, maintaining water quality. A vegetation management plan will be developed in consultation with the appropriate agencies, and will be submitted with the final plan.

Kibby Substation and Service Building

The construction of the substation and service building will impact 4 acres of area that is currently regenerating forest. Stormwater runoff will be treated at this site through utilizing undisturbed forested buffers.





Legend

- Proposed Collector Line
- Area to be Rezoned
- Kibby Wind Power Project Area

Notes:
Orthophotography captured October 2, 2005 by J.W. Sewall Company.
Political data from Maine OGIS

520
Meters

Figure 7-12

Kibby Wind Power Project

Proposed Collector Lines

Temporary Project Construction Elements

There will be a number of temporary project elements associated with construction that, in total, will disturb approximately 53 acres of land in the project area. These include three material storage areas for rock crushers (29 acres total), equipment and component laydown areas (18 acres), a concrete batch plant (3 acres), temporary pull-off areas on Gold Brook Road (2 acres), and a construction control center and parking (1 acre). All of these features will be located below 2,700 feet (823 m) in elevation and, to the extent feasible, will either be sited in areas that have been previously disturbed, or will be co-located with other areas that have to be disturbed to implement the project. Impacts from the use of these areas will be temporary, and will coincide with the construction of the project. Upon completion of construction, these areas will be restored.

7.2.2.2 Invasive Plant Species

The establishment of invasive plant species is a concern in any area where soil is disturbed. Non-native species currently found in the project vicinity where there is disturbed soil (i.e. along existing roads, and in existing log landings and skidder trails) provide an insight into what exotic plant species may potentially become established in areas disturbed by project construction. Commonly observed non-native plants within the project vicinity include colt's foot (*Tussilago farfara*), white clover (*Trifolium repens*), and helleborine (*Epipactis helleborine*). Most herbaceous vegetation found in disturbed areas within the project vicinity are native species such as sedges, grasses, goldenrods, asters, and raspberries. It is anticipated that any new roads will become colonized with similar plant communities.

To eliminate the opportunity for undesirable plant species introductions on new road sections, disturbed soil will not be seeded or mulched with hay, but will be covered with a layer of erosion control mix. The application of this locally chipped mulch will limit the opportunity for non-native and invasive plant species to colonize disturbed areas and provide a suitable medium for indigenous shrub and tree regeneration. Furthermore, the harsh climate inherent to the project vicinity is expected to limit the suite of non-native species that are likely to become established in the due to project construction.

7.2.2.3 Habitat Conversion

The proposed project has the potential to permanently alter habitat in areas where surrounding habitat differs from that of the permanent facilities. Habitat conversion incurs a loss of original habitat types which, in turn, may affect species that are dependant on the habitat type being lost. Habitat conversion may also affect species that are attracted to the habitat that is introduced.

In general, given the existing land use and landscape characteristics of the project vicinity, construction and maintenance of proposed project elements below 2,700 feet (823 m) elevation will not impose habitat conversions that are not already common to the area.

In general, given the existing character of the project landscape, no habitat conversion will occur that is incongruous with that which is already extant, occurring or impending in the project vicinity. Habitat conversion in P-MA zones will be isolated to the discrete, linear configuration of turbine locations along access roads; this configuration will minimize disruption of the surrounding habitats. For these reasons, wildlife impacts as a result of project-related habitat conversion are expected to be minimal in P-MA zones, and non-extant in areas below 2,700 feet (823 m) elevation. It is fully anticipated that local wildlife populations will adapt and respond to project-related habitat conversion much as they already do to ongoing forest management activities that are inherent to local landscape.

7.2.2.4 Forest Fragmentation

Fragmentation is the division of habitat into smaller and smaller patches that become more and more isolated from each other and from larger forested areas. These smaller patches are believed to be of lower quality, consequently providing less suitable habitat for native wildlife populations.

Continuous large tracts of mature forest wildlife habitats are considered highly valuable. Fragmentation, loss of habitat and loss of connectivity between large blocks of forested habitat have been cited as threats to Maine's forests. Maine's Comprehensive Wildlife Conservation Strategy (MDIFW 2005) defines "Large-scale forestry operations that result in habitat fragmentation, change in over- and under-story species composition (stand conversion); significant reduction in rotation length resulting in reduction in area of mature forest stands; loss of large blocks of forested habitat (>10,000 acres) and connectivity between large blocks; habitat loss and fragmentation associated with development and building of permanent roads…" as threats to upland coniferous, deciduous and mixed forest communities in Maine.

For the above reasons, the USFWS Interim Guidelines to Avoid and Minimize Impacts from Wind Turbines (USFWS 2003) recommends that such developments:

> *Avoid fragmenting large, continuous tracts of wildlife habitat. Where practical, place turbines on lands already altered or cultivated, and away from areas of intact and healthy native habitats. If not practical, select fragmented or degraded habitats over relatively intact areas.*

Potential Project-Incurred Fragmentation

As previously discussed, logging is a widespread and ongoing practice in the project vicinity. Therefore, the landscape (below 2,700 feet [823 m] elevation) is constantly changing, with mature forests being actively cut and infiltrated by associated logging roads, while regenerating stands inherently grow towards maturity. Forests in P-MA zones, while typically in later stages of regeneration and in some cases at or approaching maturity, have been degraded by logging activities in the past century. In general, the landscape in the project vicinity represents lands that are "already altered…fragmented or degraded (USFWS 2003)".

The Kibby Wind Power Project elements are generally narrow and linear in configuration. The Kibby Wind Power Project roads along the ridges between turbines will have a 34 foot wide travel corridor during construction, only 20 feet of which will be maintained following construction. These roads will represent narrow breaks in the forest vegetation, but will not result in the separation or isolation of forest stands through which they traverse. Clearings for wind turbines will be approximately 1 acre in size, will be located along the road and, except for the turbine foundation and a crane pad, will be allowed to naturally revegetate to native low shrubs and herbaceous cover. Likewise, these small openings will occur as islands within the forest, and will not isolate or separate forest tracts where they occur.

Transmission collector line ROWs will be maintained as shrub-dominated habitats within a landscape that already contains a high occurrence of perpetually young, regenerating forest and clearcuts.

In summary, given the existing character of the project vicinity, the proposed project is not expected to incur fragmentation impacts beyond that which is already extant, occurring, or impending in this dynamic landscape. In P-MA zones, the narrow, linear character of project elements limits fragmentation of the existing vegetative community.

Potential Wildlife Impacts

Much research has been focused on determining the responses of wildlife assemblages to the size and degree of isolation of forest fragments. Most studies examine bird communities in fragments in agricultural areas, where forest stands are isolated and there has been a marked decrease in the regions' total forest area. Forest fragmentation, however, must be looked at from a landscape scale. Studies which have focused on the effects of fragmentation in forested landscapes are limited, but suggest that known effects (such as increased nest predation and isolation) are suppressed in a forested versus an agricultural or developed landscape (Sabine et al. 1996, Flatebo et al. 1999, Small and Hunter 1988, Rudnicky and Hunter 1993). Notably, the project area is located in a region which, though heavily altered by forestry, still possesses the characteristics of a forested landscape.

Some bird species observed in the project area that may be sensitive to forest fragmentation are the long-distance, neotropical migrants which rely on forest interior habitats. However, plentiful suitable habitat will continue to be found in the project area for these interior forest species. Most of the potential breeding birds that are likely to be found in the vicinity of the proposed project are not dependent on mature forest stands. Such species are typically found in forest settings that have a variety of timber size classes from young regenerating forest areas to larger mature trees (DeGraaf et al. 1992).

Most of the terrestrial mammal species that are likely to be found in the vicinity of the proposed project are not dependent on mature forest. Most mammal species observed are typically found in forests that have a variety of size classes (DeGraaf et al. 1992). Forest fragments have been found to be important to species which do not require forest interior and rely more on the interior

of edges (Blake and Karr 1987; Freemark and Collins 1992). Although the current landscape in the project vicinity is heavily altered by forestry, ample forest tracts remain intact for those species which rely on large ranges of interior forest.

In summary, the impacts of fragmentation on wildlife in a forested landscape are still not well understood due to limited studies in this environment (Flatebo 1999). As discussed above, the conditions created by decades of forestry in the project vicinity creates a landscape that is already degraded and altered. In areas below 2,700 feet (823 m), The proposed project will not incur fragmentation or associated wildlife impacts beyond that which is already extant, occurring, or impending in this dynamic landscape. In P-MA zones, the narrow, linear configuration of project elements limits potential for fragmentation effects on wildlife using these areas. Overall, local wildlife species are fully expected to respond to the proposed project much as they already do to current logging impacts.

7.2.2.5 Edge Effects

Abrupt linear edges are inherent to corridors such as those that will be created by turbine strings, access roads and transmission inter-ties; this edge will be most evident where project development occurs in forested areas. In such areas, the abrupt edge can create a transitional zone which is characterized by species, habitat and microclimate that differs from both the forest and the corridor (Willyard et al 2004). Corridors can also, depending on width and structure, form distinct species groups associated with the forest interior, corridor interior, or edge habitats (Anderson et al. 1977, Chasko and Gates 1982, Gates 1991). The transitional zone between forest and corridor is often associated with increased species density and diversity; however, this trend may favor habitat generalists (Willyard et al 2004).

Overall, edge effects may be multiple and complex (Reis et al. 2004). Examples of complex interactions that may occur include alteration of predator/prey relationships, and ecological traps. Predator/prey interactions may be affected by increased densities of either party in edge habitats (Willyard et al 2004), or by facilitation of predator movement along the forest edge (Marklevitz 2003). Ecological traps (or sinks) occur along forest edges when mortality exceeds production (Willyard et al 2004). For example, Flaspohler et al. (2001) found that nest density for two ground-nesting species (hermit thrush and ovenbird) in a forested landscape increased in the forested zone near an opening; meanwhile, nesting success decreased.

As discussed in previous sections, cut areas (in various stages of regeneration) and logging roads are common to the project landscape. These areas already present a high degree of edge habitat that is similar to that which will be incurred by the proposed project. Given these existing conditions, the proposed project will not create edges (and thereby edge effects) incongruous with those that are extant, being introduced, or are impending due to forestry practices in the region. Edge species and interior edge species are expected to inhabit portions of the transmission line inter-ties and wind turbine clearings. Local wildlife species are fully expected to respond to project-related edge effects much as they already do to current logging impacts in the project vicinity.

7.3 Unusual Natural Areas

7.3.1 Existing Resources

TransCanada consulted with MNAP regarding the presence of rare or unique botanical features in the vicinity of the project area (see Figure 7-13). Rare and unique botanical features are areas that include habitat for rare, threatened or endangered plant species and unique or exemplary natural communities. This consultation identified the presence of a mapped Subalpine Fir Forest on Kibby Mountain.

TransCanada also consulted with MDIFW regarding the potential presence of Significant and Essential Wildlife Habitat in the project area (Appendix 7-B). Essential Habitats are defined as "areas currently or historically providing physical or biological features essential to the conservation of an endangered or threatened species in Maine and which may require special management considerations." Currently, Essential Habitat protection in Maine applies to bald eagle, roseate and least tern and piping plover nest sites. No protected Essential Habitat areas were identified within the project area.

Significant Wildlife Habitat is defined by the Natural Resources Protection Act (NRPA) and includes certain of the following types of areas:

- Mapped habitat for state and federally listed endangered and threatened species;
- Mapped high and moderate value deer wintering areas (DWAs) and travel corridors;
- High and moderate value waterfowl and wading bird habitats (WWHs), including nesting and feeding areas;
- Shorebird nesting feeding and staging areas; and
- Seabird nesting islands.

Starting in September 2007, significant vernal pools will also be regulated as significant wildlife habitat under NRPA. Vernal pool habitats are discussed in Section 8.5.

State and federally listed endangered and threatened species and habitat are discussed in the following section. With respect to other Significant Wildlife Habitat in the project area, no areas were identified by MDIFW within the areas proposed for wind turbine development. A WWH area ranked as having a moderate value is located approximately 650 feet (198 m) from an existing access road which will serve the A Series of wind turbines on Kibby Mountain. The project will not substantially change the existing use of that road and is not likely to result in impacts to this area.