activities within an area of previously cutover forest. It is therefore unlikely that that Southern flying squirrel habitat will be impacted as a result of the Project.

4.6.2 Herpetofauna

Nova Scotia's reptile and amphibian community consists of 25 species, a relatively low level of diversity when compared to mainland areas of the continent (Davis and Browne 1996). However, the same factors that have limited post-glacial species colonization in the province, namely climatic changes, have caused amphibian and reptile populations to become isolated, leading to a higher degree of morphologic variation than seen in continental populations (Davis and Browne 1996).

Information regarding the herpetofaunal community in the vicinity of the Project site, including any SAR, was obtained through a combination of desktop review and field studies. The desktop component included a review of the Nova Scotia Significant Species and Habitat Database and ACCDC data on species recorded within a 100 km radius of the Project site, and the comparison of habitat mapping data (Section 4.4) to known habitat requirements for species expected to occur within the area and for all SAR.

The Significant Species and Habitats database (NSDNR 2012a) indicates that multiple features related to herpetofaunal species are present within a 100 km radius of the Project site. However, there are no habitat or species records for herpetofauna within a 25 km radius of the Project site.
Table 4.13 lists the reptile and amphibian species recorded by ACCDC within a 100 km radius of the Project site.

Table 4.13: Reptile and Amphibian Species Recorded within a 100 km radius of the Project Site

Common Name	Scientific Name	NSDNR Status[1]	COSEWIC Status[2]	SARA Status[3]	NSESA Status[4]
Snapping turtle	*Chelydra serpentina*	Green	Special Concern	Special Concern	Not Listed
Wood turtle	*Glyptemys insculpta*	Yellow	Threatened	Threatened	Vulnerable
Blanding's turtle	*Emydoidea blandingii*	Red	Endangered	Endangered	Endangered
Eastern ribbonsnake	*Thamnophis sauritus*	Red	Threatened	Threatened	Threatened

Source: ACCDC 2012

[1] NSDNR 2010; [2] COSEWIC 2012a; [3] SARA 2011; [4] NSESA 2007

The same data limitations and interpretations noted for the mammalian fauna (Section 4.6.1) are also applicable to the reptile and amphibian data.

Field studies of amphibian and reptile species were conducted in conjunction with other field surveys completed between September 2011 and July 2012. Species were either identified directly through visual observation, or indirectly using other evidence (i.e. calls, egg masses, tadpoles, etc.). Table 4.14 lists the amphibian and reptile species identified at or near the Project site during field studies.

Table 4.14: Reptile and Amphibian Species Observed at the Project Site

Common Name	Scientific Name	NSDNR Status[1]	COSEWIC Status[2]	NSESA Status[3]
Green frog	*Rana clamitans melanota*	Green	Not Listed	Not Listed
Northern leopard frog	*Rana pipiens*	Green	Not at Risk	Not Listed
Northern spring peeper	*Pseudocaris crucifer crucifer*	Green	Not Listed	Not Listed

[1] NSDNR 2010; [2] COSEWIC 2012a; [3] SARA 2011; [4] NSESA 2007

Species at Risk Analysis
Amphibian or reptile species identified during field studies or that have been recorded within a 100 km radius of the Project site were screened against the criteria outlined in the "Guide to Addressing Wildlife Species and Habitat in an EA Registration Document" (NSE 2005) to develop a list of priority species. These priority species include:

- Blanding's turtle – "Red" (NSDNR 2010), "Endangered" (COSEWIC 2012a), "Endangered" (NSESA 2007);
- Eastern ribbonsnake – "Red" (NSDNR 2010), "Threatened" (COSEWIC 2012a), "Threatened" (SARA 2011), "Threatened" (NSESA 2007);
- Snapping turtle – "Special Concern" (COSEWIC 2012a), "Special Concern" (SARA 2011); and
- Wood turtle – "Yellow" (NSDNR 2010), "Threatened" (COSEWIC 2012a), "Threatened" (SARA 2011), "Vulnerable" (NSESA 2007).

None of the priority species listed above were observed during field assessments.

Wood turtles prefer clear, moderately flowing watercourses in forests and are often associated with alder riparian zones. The species is found throughout the province, with a known concentration east of the Project site in Guysborough County (MTRI 2008). Although Wood turtles likely occur in the vicinity of the Project site, suitable habitat is absent due to the lack of watercourses. The Project, therefore, is unlikely to impact Wood turtle populations.

Blanding's turtles exploit freshwater wetlands such as marshes, swamps, and bogs. Although a significant treed bog is present at the Project site, the known distribution of this species in Nova Scotia is restricted to an area near Kejimkujik National Park, with sporadic sightings in southwestern parts of the province (MTRI 2008). Due to the geographic separation between the known range of the species and the Project site, it is unlikely that Project activities will affect Blanding's turtle.

Similarly, the Eastern ribbonsnake is found in freshwater habitat types, similar to the treed bog present at the Project site (MTRI 2008). However, this species appears to be restricted to southwestern parts of the province, and is unlikely to be present at or near the Project site.

4.6.3 Butterflies
There are approximately 13,000 species of insects in Nova Scotia, of which 2,000 are moths and butterflies (Davis and Browne 1996). Some species have ranges limited by habitat type

and/or the availability of host species (Davis and Browne 1996), and others are present only at certain times of year (The Butterflies of Nova Scotia 2008).

Information regarding the butterfly community at the Project site was obtained through a desktop review of ACCDC data. Table 4.15 lists the butterfly species recorded within a 100 km radius of the Project site, according to the ACCDC data.

Table 4.15: Butterfly Species Recorded within a 100 km radius of the Project Site

Common Name	Scientific Name	NSDNR Status[1]	COSEWIC Status[2]	SARA Status[3]	NSESA Status[4]
Aphrodite fritillary	*Speyeria aphrodite*	Green	Not Listed	Not Listed	Not Listed
Arctic fritillary	*Boloria chariclea*	Yellow	Not Listed	Not Listed	Not Listed
Baltimore checkerspot	*Euphydryas phaeton*	Green	Not Listed	Not Listed	Not Listed
Common branded skipper	*Hesperia comma*	Green	Not Listed	Not Listed	Not Listed
Common roadside-skipper	*Amblyscirtes vialis*	Green	Not Listed	Not Listed	Not Listed
Compton tortoiseshell	*Nymphalis l-album*	Green	Not Listed	Not Listed	Not Listed
Eastern comma	*Polygonia comma*	Not Listed	Not Listed	Not Listed	Not Listed
Eastern pine elfin	*Callophrys niphon*	Green	Not Listed	Not Listed	Not Listed
Gray comma	*Polygonia progne*	Green	Not Listed	Not Listed	Not Listed
Green comma	*Polygonia faunus*	Green	Not Listed	Not Listed	Not Listed
Jutta arctic	*Oeneis jutta*	Red	Not Listed	Not Listed	Not Listed
Juvenal's duskywing	*Erynnis juvenalis*	Green	Not Listed	Not Listed	Not Listed
Laurentian skipper	*Hesperia comma*	Green	Not Listed	Not Listed	Not Listed
Milbert's tortoiseshell	*Aglais milberti*	Green	Not Listed	Not Listed	Not Listed
Monarch	*Danaus plexippus*	Yellow	Special Concern	Special Concern	Not Listed
Mustard white	*Pieris oleracea*	Yellow	Not Listed	Not Listed	Not Listed
Northern cloudywing	*Thorybes pylades*	Yellow	Not Listed	Not Listed	Not Listed
Northern pearly-eye	*Lethe anthedon*	Green	Not Listed	Not Listed	Not Listed
Question mark	*Polygonia interrogationis*	Green	Not Listed	Not Listed	Not Listed
Salt and pepper skipper	*Amblyscirtes hegon*	Green	Not Listed	Not Listed	Not Listed
Satyr comma	*Polygonia satyrus*	Yellow	Not Listed	Not Listed	Not Listed

Common Name	Scientific Name	NSDNR Status[1]	COSEWIC Status[2]	SARA Status[3]	NSESA Status[4]
Silvery checkerspot	*Chlosyne nycteis*	Undetermined	Not Listed	Not Listed	Not Listed
Striped hairstreak	*Satyrium liparops*	Undetermined	Not Listed	Not Listed	Not Listed

Source: ACCDC 2012

[1] NSDNR 2010; [2] COSEWIC 2012a; [3] SARA 2011; [4] NSESA 2007

Species at Risk Analysis

Butterfly or moth species that have been recorded within a 100 km radius of the Project site were screened against the criteria outlined in the "Guide to Addressing Wildlife Species and Habitat in an EA Registration Document" (NSE 2005) to develop a list of priority species. These priority species include:

- Arctic fritillary – "Yellow" (NSDNR 2010);
- Jutta arctic – "Red" (NSDNR 2010);
- Monarch – "Yellow" (NSDNR 2010), "Special Concern" (COSEWIC 2012a), "Special Concern" (SARA 2011);
- Northern cloudywing – "Yellow" (NSDNR 2010); and
- Satyr comma – "Yellow" (NSDNR 2010).

The Arctic fritillary is generally found in boreal woodlands and bogs in the eastern part of its range (Layberry et al. 1998). These habitats are found at the Project site, so it is possible that this species occurs in the vicinity of the proposed Project. However, the footprint of the Project does not extend into bog habitat, so adverse impacts on the Arctic fritillary or its habitat are not anticipated.

Although the Jutta arctic is listed as a "Red" species (i.e. at risk) by NSDNR (2010), it is known to be locally common in some parts of its range (Layberry et al. 1998). The species is closely tied to black spruce-eastern larch bogs. Although this type of treed bog is present at the Project site, the species is only known from a few locations in Cumberland County and northern Cape Breton Island (Maritime Butterfly Atlas 2012). It is therefore unlikely that Project activities will impact Jutta arctic populations.

The Monarch is common to abundant in Nova Scotia during its fall migration (The Butterflies of Nova Scotia 2008). This species is known to gather in large numbers during migration, congregating in dense clusters on overwintering grounds in Mexico, and creating large groups that may be vulnerable to mortality factors. It is possible that the Monarch will occur at or near the Project site, particularly during the fall.

The Northern cloudywing is common and widespread, but rarely abundant (Layberry et al. 1998). Ferguson (1955) indicated only three records of this species in Nova Scotia, from Pictou and Colchester Counties, and no recent sightings have been reported to the ACCDC (Maritime Butterfly Atlas 2011). Little is known of the status of this species in Nova Scotia, although it is known that Northern cloudywings rarely occur in developed areas (Layberry et

al. 1998). Due to the relative scarcity of this species in Nova Scotia, and its preference for undeveloped areas, it is unlikely to occur at the Project site. .

The Satyr comma occurs sporadically in the eastern provinces (Layberry et al. 1998) and exploits boreal forest habitat in the region. Much of the Project site features coniferous stands. This species may occur in the softwood dominated habitats at the site. If Project activities were to displace some individuals, adequate alternative habitat should be available in nearby undisturbed areas. It is therefore unlikely that the Project will negatively affect Satyr comma populations.

4.6.4 Effects and Mitigation

It is widely acknowledged that wind energy development can have a suite of potential direct and indirect impacts on terrestrial fauna, including sensory disturbance, direct mortality, habitat fragmentation, and habitat alteration through the introduction of exotic species (Kuvlevsky, Jr. et al. 2007).

Sensory disturbance related to noise and increased visual stimuli have the potential to affect wildlife populations in the vicinity of the Project. These types of disturbances will occur throughout all phases of the Project and could lead to displacement or local extirpation, and/or changes to regular activity patterns. Disturbance will be greatest during construction and decommissioning phases, where the increased presence of site personnel, vehicles, and heavy equipment will likely disturb local wildlife and may result in the temporary avoidance of work areas. This is most likely to have a greater effect on diurnal species since work will be restricted to daylight hours, whenever possible. However, these effects are not expected to persist in the long-term as the construction and decommissioning phases are expected to be short and disturbance will subside following completion. Furthermore, the Project is located in an area that currently receives significant truck traffic on a daily basis due to the proximity of the Kaizer Meadow Environmental Management Centre. Activities related to construction and decommissioning are therefore not expected to result in a significant increase of noise disturbance levels.

During the operational phase of the Project, sensory disturbance to wildlife will be limited to the presence of on-site personnel conducting maintenance on Project infrastructure. Since the Project site is located in close proximity to the Kaizer Meadow Environmental Management Centre, local wildlife are likely habituated to the presence of humans. Furthermore, site visits are likely to be infrequent and short in time. Activities related to operation and maintenance are therefore not expected to result in a significant increase of noise disturbance levels.

Direct mortality of wildlife resulting from the Project is not expected to be significant. Wildlife species that are mobile will be able to actively avoid areas of disturbance. Furthermore, many of the more prominent species should be detected by site personnel during construction activities such that work will not endanger observed wildlife. Nonetheless, there is potential for some wildlife to suffer mortality during the construction and decommissioning phases of the Project. Since the construction and decommissioning periods are short, mortalities associated with these phases are not expected to be significant.

Once the Project enters the operational and maintenance phase, no direct mortality of terrestrial wildlife is expected. Possible mortality of individuals may occur as a result of collisions with vehicles at the Project site, however it is unlikely since the access road to the turbine is short and will be used infrequently. Collisions, should they occur, are more likely to occur as a result of the existing traffic associated with the Kaizer Meadow Environmental Management Centre and nearby Highway 14. No population level effects are expected from mortality during the operation and maintenance phase.

Large mammals may be impacted by development of wind energy, however virtually nothing is known about habitat-related impacts on other species of wildlife, including reptiles, amphibians, forest carnivores, and small mammals (Arnett. et al. 2007). Albeit unexpected, habitat fragmentation and alteration is more likely to occur during the construction and decommissioning phases of the project. Since the Project footprint incorporates an existing area of cutover, additional clearing of vegetation and resulting fragmentation and alteration of habitat is not expected, and is therefore regarded as not being significant.
Potential effects on terrestrial fauna, during different phases of the Project, are summarized in Table 4.16.

Table 4.16: Potential Effects on Terrestrial Fauna

Effect	Source of Effect	*Phase Applicable to		
		C	O/M	D
Sensory disturbance	Noise, vibration, and/or visual disturbance from site personnel, equipment, and/or turbine	✔	✔	✔
Mortality	Heavy equipment operation; collision with Project vehicles	✔		✔
Habitat fragmentation and alteration	Clearing of vegetation (minimal).	✔	✔	✔

**C – Construction Phase O/M Operations/Maintenance Phase D – Decommissioning Phase*

The following mitigative measures will be implemented to minimize or eliminate impacts to terrestrial fauna (not including avifauna) and associated habitat:

- Minimization of the footprint of physical disturbance by:
  - locating the turbine and access road on previously disturbed land (i.e. clear cut) where possible;
  - locating the turbine and access road outside of sensitive habitats such as watercourses and wetlands,;
  - minimization of routine vegetation clearing;
  - minimization of clearing ;
  - restoration of areas of disturbance where possible, post construction;
  - location of all site construction compounds, parking lot or office on non-sensitive areas and/or areas of previous disturbance; and
- Completion of a comprehensive schedule and determination of timelines in order to efficiently complete site activities within the shortest time frames possible.

Species-Specific Mitigation
Desktop and field species at risk analyses have revealed several priority species that have the potential to occur at the Project site. Addressing the potential impacts of the Project on these species will require species-specific mitigation techniques, as described below.

Moose:

- If evidence of Moose is identified at the Project site, the proponent will consult with NSDNR regarding strategies to minimize and mitigate potential impacts.

Monarch:

- If large congregations of Monarchs are identified at the Project site, activities in the area should be ceased until the migrating group has left the site. This is most likely to occur in late summer prior to the fall migration.

The mitigation measures described above are considered to be standard best practices, and are expected to address potential impacts. Therefore, terrestrial fauna is not further assessed.

4.7 Avifauna and Bats

4.7.1 Avifauna

4.7.1.1 Desktop Review

The diversity and abundance of birds in Nova Scotia is related to habitat factors, geography, and seasonality (Davis and Browne 1996). Most of the Project site is forested (91%) and treed bog habitat is also present. These cover types provide suitable habitat for a variety of breeding, resident, and migratory bird species.

A review of the Important Bird Areas (IBAs) in Canada revealed that the closest IBA to the Project site is 23 km to the northeast. The Southern Bight, Minas Basin IBA, is classified as globally significant due to high concentrations of shorebirds and congregatory species (IBA Canada 2010).

Information on the use of the Project site by birds was also obtained through a desktop review of available data from sources including the Maritime Breeding Bird Atlas (MBBA 2011), Nova Scotia Significant Species and Habitats database (NSDNR 2012a), and the ACCDC (2012). This information was used to gain insight into which species were utilizing the area during different times, and to identify priority species potentially occurring at or near the Project site.

The Project site lies close to the border between map squares 20MQ05 and 20LQ95, and in the most recent edition of the MBBA (covering the years 2006-2010), 90 species were identified as being possible, probable, or confirmed breeders within these two survey areas. These species include common passerines such as Black-capped Chickadee (*Poecile atricapillus*), Common Yellowthroat (*Geothlypis trichas*), Dark-eyed Junco (*Junco hyemalis*), and Red-breasted Nuthatch (*Sitta canadensis*), as well as common waterfowl such as

American Black Duck (*Anas rubripes*) and Green-winged Teal (*Anas crecca*). The following priority species are considered possible breeders in the two survey areas:

- American Bittern (*Botaurus lentiginosus*) – "Yellow" (NSDNR 2010);
- Barn Swallow (*Hirundo rustica*) – "Yellow" (NSDNR 2010), "Threatened" (COSEWIC 2012a);
- Bay-breasted Warbler (*Dendroica castanea*) – "Yellow" (NSNDR 2010);
- Black-backed Woodpecker (*Picoides arcticus*) – "Yellow" (NSDNR 2010);
- Boreal Chickadee (*Poecile hudsonicus*) – "Yellow" (NSDNR 2010);
- Cape May Warbler (*Dendroica tigrina*) – "Yellow" (NSDNR 2010);
- Chimney Swift (*Chaetura pelagica*) – "Red" (NSDNR 2010), "Threatened" (COSEWIC 2012a), "Threatened" (SARA 2011), "Endangered" (NSESA 2007);
- Cliff Swallow (*Petrochelidon pyrrhonota*) – "Red" (NSDNR 2010);
- Common Loon (*Gavia immer*) – "Red" (NSDNR 2010);
- Common Nighthawk (*Chordeiles minor*) – "Red" (NSDNR 2010), "Threatened" (COSEWIC 2012a), "Threatened" (SARA 2011), "Threatened" (NSESA 2007);
- Eastern Kingbird (*Tyrannus tyrannus*) – "Yellow" (NSDNR 2010);
- Eastern Phoebe (*Sayornis phoebe*) – "Yellow" (NSDNR 2010);
- Eastern Wood-Pewee (*Contopus virens*) – "Yellow" (NSDNR 2010);
- Golden-crowned Kinglet (*Regulus satrapa*) – "Yellow" (NSDNR 2010);
- Gray Catbird (*Dumetella carolinensis*) – "Red" (NSDNR 2010);
- Gray Jay (*Perisoreus canadensis*) – "Yellow" (NSDNR 2010);
- Killdeer (*Charadrius vociferous*) – "Yellow" (NSDNR 2010);
- Northern Pintail (*Anas acuta*) – "Red" (NSDNR 2010);
- Olive-sided Flycatcher (*Contopus cooperi*) – "Red" (NSDNR 2010), "Threatened" (COSEWIC 2012a), "Threatened" (SARA 2011);
- Pine Siskin (*Spinus pinus*) – "Yellow" (NSDNR 2010);
- Ruby-crowned Kinglet (*Regulus calendula*) – "Yellow" (NSDNR 2010);
- Spotted Sandpiper (*Actitis macularius*) – "Yellow" (NSDNR 2010);
- Tree Swallow (*Tachycineta bicolor*) – "Yellow" (NSDNR 2010); and
- Yellow-bellied Flycatcher (*Empidonax flaviventris*) – "Yellow" (NSDNR 2010).

The Nova Scotia Significant Species and Habitats database identifies 655 significant habitat features associated with birds within a 100 km radius of the Project site (Table B1, Appendix B). Of these records, 39 are within a 25 km radius of the Project site. Two patterns are apparent when reviewing this data: a) a system of offshore islands in the Chester Basin (approximately 20 km to the south of the Project site) provides important habitat for a variety of birds of prey and waterfowl species, including Bald Eagle (*Haliaeetus leucocephalus*), Osprey (*Pandion haliaetus*), Great Blue Heron (*Ardea herodias*), Common Tern (*Sterna hirundo*), and Common Eider (*Somateria mollissima*); and b) the northern lakes in the broader Project area provide important breeding habitat for the Common Loon (*Gavia immer*).

Data from the ACCDC database was reviewed to evaluate recorded sightings of birds within a 100 km radius of the Project site. Table 4.17 lists the bird species recorded within this search radius, as well as provincial and national conservation status ranks.

Table 4.17: Bird Species Recorded within a 100 km Radius of the Project Site

Common Name	Scientific Name	NSDNR Status[1]	COSEWIC Status[2]	SARA Status[3]	NSESA Status[4]
American Bittern	*Botaurus lentiginosus*	Yellow	Not Listed	Not Listed	Not Listed
American Coot	*Fulica americana*	Undetermined	Not at Risk	Not Listed	Not Listed
American Golden-Plover	*Pluvialis dominica*	Yellow	Not Listed	Not Listed	Not Listed
Arctic Tern	*Sterna paradisaea*	Red	Not Listed	Not Listed	Not Listed
Atlantic Puffin	*Fratercula arctica*	Yellow	Not Listed	Not Listed	Not Listed
Baltimore Oriole	*Icterus galbula*	Red	Not Listed	Not Listed	Not Listed
Bank Swallow	*Riparia riparia*	Red	Not Listed	Not Listed	Not Listed
Barn Swallow	*Hirundo rustica*	Yellow	Threatened	No Status	Not Listed
Bay-breasted Warbler	*Dendroica castanea*	Yellow	Not Listed	Not Listed	Not Listed
Bicknell's Thrush	*Catharus bicknelli*	Red	Threatened	Special Concern	Vulnerable
Black Guillemot	*Cepphus grylle*	Green	Not Listed	Not Listed	Not Listed
Black-backed Woodpecker	*Picoides arcticus*	Yellow	Not Listed	Not Listed	Not Listed
Black-billed Cuckoo	*Coccyzus erythropthalmus*	Red	Not Listed	Not Listed	Not Listed
Black-legged Kittiwake	*Rissa tridactyla*	Yellow	Not Listed	Not Listed	Not Listed
Blackpoll Warbler	*Dendroica striata*	Yellow	Not Listed	Not Listed	Not Listed
Blue-winged Teal	*Anas discors*	Red	Not Listed	Not Listed	Not Listed
Bobolink	*Dolichonyx oryzivorus*	Yellow	Threatened	No Status	Not Listed
Boreal Chickadee	*Poecile hudsonicus*	Yellow	Not Listed	Not Listed	Not Listed
Boreal Owl	*Aegolius funereus*	Undetermined	Not at Risk	Not Listed	Not Listed
Brant	*Branta bernicla*	Yellow	Not Listed	Not Listed	Not Listed
Brown Thrasher	*Toxostoma rufum*	Undetermined	Not Listed	Not Listed	Not Listed
Brown-headed Cowbird	*Molothrus ater*	Green	Not Listed	Not Listed	Not Listed
Canada Warbler	*Wilsonia canadensis*	Red	Threatened	Threatened	Not Listed
Cape May Warbler	*Dendroica tigrina*	Yellow	Not Listed	Not Listed	Not Listed
Chimney Swift	*Chaetura pelagica*	Red	Threatened	Threatened	Endangered
Cliff Swallow	*Petrochelidon pyrrhonota*	Red	Not Listed	Not Listed	Not Listed
Common Goldeneye	*Bucephala clangula*	Green	Not Listed	Not Listed	Not Listed
Common Loon	*Gavia immer*	Red	Not at Risk	Not Listed	Not Listed

Common Name	Scientific Name	NSDNR Status[1]	COSEWIC Status[2]	SARA Status[3]	NSESA Status[4]
Common Moorhen	*Gallinula chloropus*	Undetermined	Not Listed	Not Listed	Not Listed
Common Nighthawk	*Chordeiles minor*	Red	Threatened	Threatened	Threatened
Common Tern	*Sterna hirundo*	Yellow	Not at Risk	Not Listed	Not Listed
Eastern Bluebird	*Sialia sialis*	Yellow	Not at Risk	Not Listed	Not Listed
Eastern Kingbird	*Tyrannus tyrannus*	Yellow	Not Listed	Not Listed	Not Listed
Eastern Meadowlark	*Sturnella magna*	Yellow	Threatened	No Status	Not Listed
Eastern Phoebe	*Sayornis phoebe*	Yellow	Not Listed	Not Listed	Not Listed
Eastern Wood-Pewee	*Contopus virens*	Yellow	Not Listed	Not Listed	Not Listed
Fox Sparrow	*Passerella iliaca*	Green	Not Listed	Not Listed	Not Listed
Gadwall	*Anas strepera*	Red	Not Listed	Not Listed	Not Listed
Gray Catbird	*Dumetella carolinensis*	Red	Not Listed	Not Listed	Not Listed
Gray Jay	*Perisoreus canadensis*	Yellow	Not Listed	Not Listed	Not Listed
Great Cormorant	*Phalacrocorax carbo*	Yellow	Not Listed	Not Listed	Not Listed
Great Crested Flycatcher	*Myiarchus crinitus*	Red	Not Listed	Not Listed	Not Listed
Greater Yellowlegs	*Tringa melanoleuca*	Yellow	Not Listed	Not Listed	Not Listed
Harlequin Duck - Eastern pop.	*Histrionicus histrionicus*	Red	Special Concern	Special Concern	Endangered
Horned Lark	*Eremophila alpestris*	Green	Not Listed	Not Listed	Not Listed
Hudsonian Godwit	*Limosa haemastica*	Yellow	Not Listed	Not Listed	Not Listed
Indigo Bunting	*Passerina cyanea*	Undetermined	Not Listed	Not Listed	Not Listed
Killdeer	*Charadrius vociferus*	Yellow	Not Listed	Not Listed	Not Listed
Laughing Gull	*Leucophaeus atricilla*	Green	Not Listed	Not Listed	Not Listed
Least Sandpiper	*Calidris minutilla*	Green	Not Listed	Not Listed	Not Listed
Long-eared Owl	*Asio otus*	Red	Not Listed	Not Listed	Not Listed
Northern Bobwhite	*Colinus virginianus*	No Status	Not Listed	Not Listed	Not Listed
Northern Cardinal	*Cardinalis cardinalis*	Green	Not Listed	Not Listed	Not Listed
Northern Gannet	*Morus bassanus*	Green	Not Listed	Not Listed	Not Listed
Northern Goshawk	*Accipiter gentilis*	Green	Not at Risk	Not Listed	Not Listed
Northern Mockingbird	*Mimus polyglottos*	Green	Not Listed	Not Listed	Not Listed
Northern Pintail	*Anas acuta*	Red	Not Listed	Not Listed	Not Listed

Common Name	Scientific Name	NSDNR Status[1]	COSEWIC Status[2]	SARA Status[3]	NSESA Status[4]
Northern Shoveler	*Anas clypeata*	Red	Not Listed	Not Listed	Not Listed
Olive-sided Flycatcher	*Contopus cooperi*	Red	Threatened	Threatened	Not Listed
Peregrine Falcon - anatum/tundrius	*Falco peregrinus*	Yellow	Special Concern	Threatened	Vulnerable
Philadelphia Vireo	*Vireo philadelphicus*	Undetermined	Not Listed	Not Listed	Not Listed
Pied-billed Grebe	*Podilymbus podiceps*	Yellow	Not Listed	Not Listed	Not Listed
Pine Grosbeak	*Pinicola enucleator*	Red	Not Listed	Not Listed	Not Listed
Pine Siskin	*Spinus pinus*	Yellow	Not Listed	Not Listed	Not Listed
Piping Plover melodus ssp.	*Charadrius melodus*	Red	Endangered	Endangered	Endangered
Purple Martin	*Progne subis*	Red	Not Listed	Not Listed	Not Listed
Purple Sandpiper	*Calidris maritima*	Yellow	Not Listed	Not Listed	Not Listed
Razorbill	*Alca torda*	Yellow	Not Listed	Not Listed	Not Listed
Red Knot rufa ssp	*Calidris canutus*	Red	Endangered	No Status	Endangered
Red Phalarope	*Phalaropus fulicarius*	Yellow	Not Listed	Not Listed	Not Listed
Red-breasted Merganser	*Mergus serrator*	Green	Not Listed	Not Listed	Not Listed
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Accidental	Not Listed	Not Listed	Not Listed
Red-necked Phalarope	*Phalaropus lobatus*	Yellow	Not Listed	Not Listed	Not Listed
Ring-billed Gull	*Larus delawarensis*	Green	Not Listed	Not Listed	Not Listed
Roseate Tern	*Sterna dougallii*	Red	Endangered	Endangered	Endangered
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	Yellow	Not Listed	Not Listed	Not Listed
Rusty Blackbird	*Euphagus carolinus*	Red	Special Concern	Special Concern	Not Listed
Scarlet Tanager	*Piranga olivacea*	Undetermined	Not Listed	Not Listed	Not Listed
Semipalmated Plover	*Charadrius semipalmatus*	Green	Not Listed	Not Listed	Not Listed
Semipalmated Sandpiper	*Calidris pusilla*	Yellow	Not Listed	Not Listed	Not Listed
Short-eared Owl	*Asio flammeus*	Red	Special Concern	Special Concern	Not Listed
Solitary Sandpiper	*Tringa solitaria*	Green	Not Listed	Not Listed	Not Listed
Spotted Sandpiper	*Actitis macularius*	Yellow	Not Listed	Not Listed	Not Listed
Tennessee Warbler	*Vermivora peregrina*	Yellow	Not Listed	Not Listed	Not Listed
Turkey Vulture	*Cathartes aura*	Yellow	Not Listed	Not Listed	Not Listed

Common Name	Scientific Name	NSDNR Status[1]	COSEWIC Status[2]	SARA Status[3]	NSESA Status[4]
Vesper Sparrow	*Pooecetes gramineus*	Red	Not Listed	Not Listed	Not Listed
Virginia Rail	*Rallus limicola*	Undetermined	Not Listed	Not Listed	Not Listed
Warbling Vireo	*Vireo gilvus*	Undetermined	Not Listed	Not Listed	Not Listed
Whip-Poor-Will	*Caprimulgus vociferus*	Red	Threatened	Threatened	Not Listed
Willet	*Tringa semipalmata*	Red	Not Listed	Not Listed	Not Listed
Willow Flycatcher	*Empidonax traillii*	Yellow	Not Listed	Not Listed	Not Listed
Wilson's Snipe	*Gallinago delicata*	Yellow	Not Listed	Not Listed	Not Listed
Wilson's Warbler	*Wilsonia pusilla*	Yellow	Not Listed	Not Listed	Not Listed
Wood Thrush	*Hylocichla mustelina*	Undetermined	Not Listed	Not Listed	Not Listed
Yellow-bellied Flycatcher	*Empidonax flaviventris*	Yellow	Not Listed	Not Listed	Not Listed

Source: ACCDC 2012

[1] NSNDR 2010; [2] COSEWIC 2012a; [3] SARA 2011; [4] NSESA 2007

4.7.1.2 Field Surveys

Field surveys were employed to complement desktop information and to characterize the pre-construction (baseline) bird community at the Project site throughout the year. These surveys were carried out by an expert birder and were designed to capture changes in the diversity and abundance of bird species at the Project site coinciding with such important events as breeding and migration. All field surveys were designed in consultation with officials from NSDNR and CWS, and conformed to protocols outlined in "Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds" (CWS 2007). Most bird surveys were planned for days when the landfill was closed in order to avoid any potential influence to local avifauna from the noise and general presence of truck traffic associated with landfill activities.

Fall Migration Surveys

The use of the Project area by migratory birds in the fall season was evaluated using two survey types: stopover counts to assess migrating flocks of passerines and passage migration counts to assess migrating raptors and other diurnal migrants. Detailed survey results are provided in Table B2, Appendix B. Drawing 4.6 provides locations of all bird survey locations.

Stopover Count Surveys

There were 11 stopover count surveys conducted at or near the Project site on November 6, 2011 (Drawing 4.6). A total of 29 species, including 1,003 individual birds, were identified during these surveys. American Crow (*Corvus brachyrhynchos*), Red-breasted Nuthatch, Purple Finch (*Carpodacus purpureus*), and Common Raven (*Corvus corax*) were the most frequently observed species, while European Starling (*Sturnus vulgaris*), Herring Gull (*Larus*

argentatus), and American Crow were the most abundant species. European Starlings and Herring Gulls were each observed in large numbers on just a single occasion.

The following priority species were observed at or near the Project site during these stopover count surveys:

- Boreal Chickadee – "Yellow" (NSDNR 2010);
- Golden-crowned Kinglet – "Yellow" (NSDNR 2010);
- Gray Jay –"Yellow" (NSDNR 2010);
- Pine Siskin – "Yellow" (NSDNR 2010);
- Ruby-crowned Kinglet – "Yellow" (NSDNR 2010);
- Rusty Blackbird (*Euphagus carolinus*) – "Red" (NSDNR 2010), "Special Concern" (COSEWIC 2012a), "Special Concern" (SARA 2011); and
- Turkey Vulture (*Cathartes aura*) – "Yellow" (NSDNR 2010).

Passage Migration Survey
A reduced passage migration survey was conducted at the Project site on November 6, 2011 (Drawing 4.6). The location of this survey was chosen to ensure an unobstructed view of the horizon enabling the identification of all migrating birds. The survey was 10 minutes in duration. Red-tailed Hawk (*Buteo jamaicensis*) was the only species identified during this survey, and the observation consisted of just a single individual.

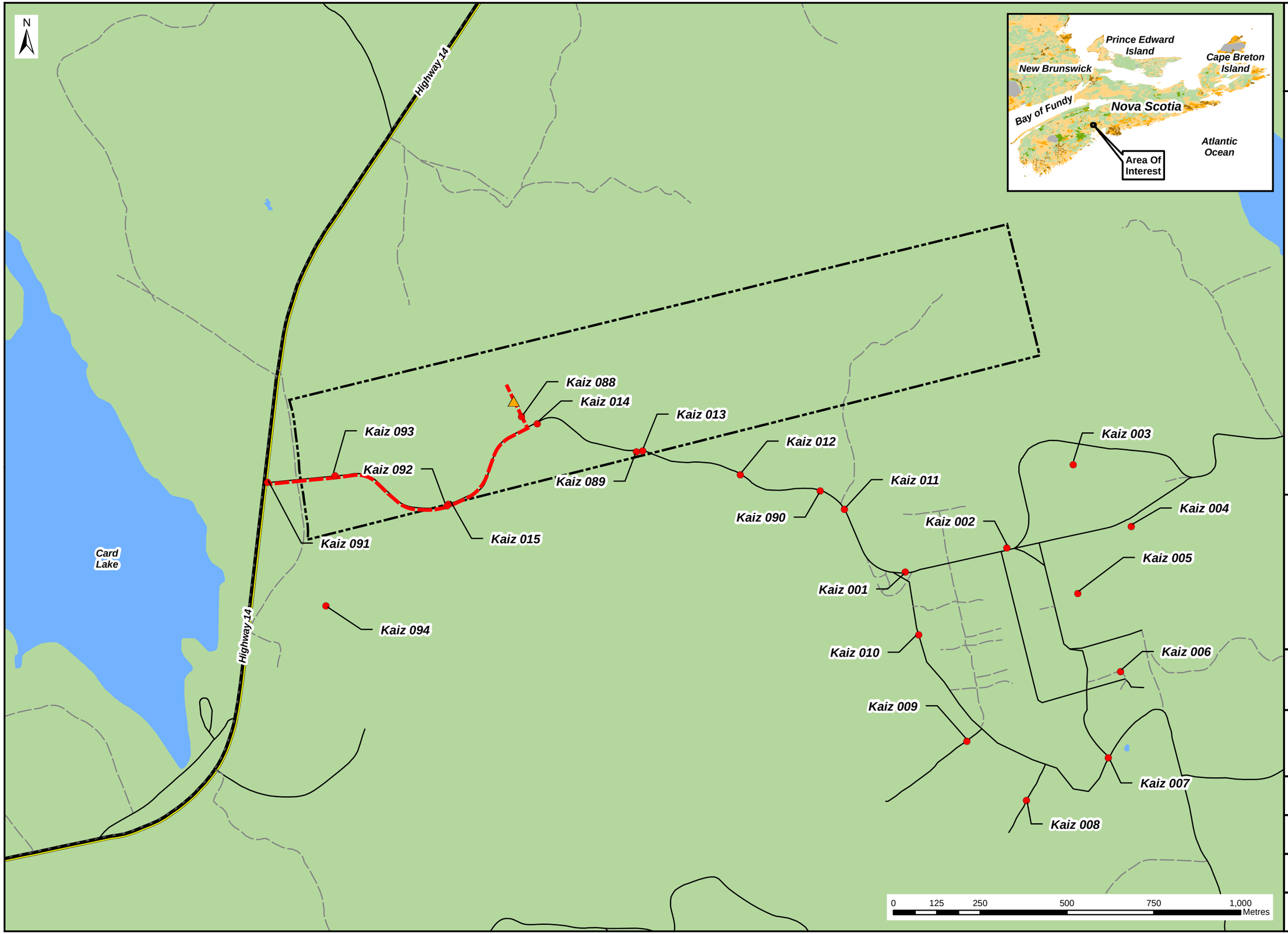
As such, no priority species were observed at the Project site during the passage migration survey.

Winter Bird Surveys
The resident winter bird community at the Project site was investigated using the area search methodology (CWS 2007). Detailed survey results are provided in Table B3, Appendix B.

There were 15 area searches conducted at or near the Project site on March 25, 2012 (Drawing 4.6). A total of 40 species were identified, including 1,171 individual birds. Common Raven was the most abundant species, although there were more observations of American Crow and Mourning Dove (*Zenaida macroura*). Herring Gulls were also prevalent during the winter bird survey, with 147 individuals observed.

The following priority species were identified at or near the Project site during these winter surveys:

- Boreal Chickadee – "Yellow" (NSDNR 2010);
- Golden-crowned Kinglet – "Yellow" (NSDNR 2010);
- Gray Jay – "Yellow" (NSDNR 2010);
- Killdeer – "Yellow" (NSDNR 2010);
- Pine Siskin – "Yellow" (NSDNR 2010); and
- Ruby-crowned Kinglet – "Yellow" (NSDNR 2010);



Notes:

1. Reference: Digital Topographic Mapping By Nova Scotia Geomatics Centre,
2. Projection: NAD83(CSRS), UTM Zone 20 North.

Legend:

- Bird Survey Locations
- Proposed Turbine Location
- Proposed Road
- Project Site Boundary
- Major Roads and Highways
- Public Roads
- Access Roads and Trails
- Water Bodies

Bird Survey Locations

MUNICIPALITY OF THE DISTRICT OF CHESTER

MINAS BASIN

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Date: June 2012	***Project #:*** 12-4360
Scale: 1:10,000	***Sheet:*** **4.6**
Drawn By: G. Gregory	
Checked By: A. Walter	

Spring Bird Migration Surveys

Spring migration surveys were conducted during site visits on April 29 and May 20, 2012. A total of 29 stopover count surveys were conducted at 15 locations at or near the Project site (Drawing 4.6). Detailed results of the spring migration surveys are provided in Table B4, Appendix B.

A total of 71 bird species, comprising 1,822 individual birds, were observed during the spring migration surveys. American Robin (*Turdus migratorius*) was the most frequently observed and most abundant species, and Common Raven and American Crow were the second and third most abundant species, respectively. Flocks in excess of 10 individuals were observed for American Robin, American Crow, American Goldfinch (*Spinus tristis*), Common Raven, European Starling, Great Black-backed Gull (*Larus marinus*), Herring Gull, Pine Siskin, Common Grackle (*Quiscalus quiscula*), and White-throated Sparrow (*Zonotrichia albicollis*).

The majority of bird species observed were passerines, but shorebird, waterfowl, woodpecker, and upland gamebird species, as well as birds of prey, were also recorded. The following priority species were identified at the Project Site during these spring migration surveys:

- Boreal Chickadee – "Yellow" (NSDNR 2010);
- Canada Warbler (*Wilsonia canadensis*) – "Red" (NSDNR 2010), "Threatened" (COSEWIC 2012a), "Threatened" (SARA 2011);
- Eastern Wood-Pewee – "Yellow" (NSDNR 2010);
- Golden-crowned Kinglet – "Yellow" (NSDNR 2010);
- Gray Jay – "Yellow" (NSDNR 2010);
- Killdeer – "Yellow" (NSDNR 2010);
- Pine Siskin – "Yellow" (NSDNR 2010);
- Ruby-crowned Kinglet – "Yellow" (NSDNR 2010);
- Tennessee Warbler (*Vermivora peregrine*) – "Yellow" (NSDNR 2010);
- Tree Swallow – "Yellow" (NSDNR 2010); and
- Yellow-bellied Flycatcher – "Yellow" (NSDNR 2010).

Breeding Bird Surveys

Breeding bird surveys were carried out at or near the Project site in 2011 using the point count methodology (CWS 2007). Survey times and locations were chosen to coincide with the peak of the breeding season and to investigate the breeding bird communities at areas of interest. Detailed survey results are provided in Table B5, Appendix B.

A total of 15 point count locations were surveyed on June 10 and 17, 2012 (Drawing 4.6). A total of 1,822 individual birds, representing 71 species, were observed during 29 point counts. Of these, 30 species are considered probable breeders based upon the observance of breeding pairs and/or the establishment of permanent territories (MBBA 2006) (Table B6, Appendix B), and 41 species were considered possible breeders. The most frequently observed species, in terms of the number of point counts at which they were recorded, were American Robin, Dark-eyed Junco, and Mourning Dove. Common Raven was the most

abundant species observed with 343 individuals recorded during the point count surveys, followed by American Robin and American Crow.

The vast majority of the species identified during the breeding bird surveys were passerines. However, a variety of non-passerine birds were also observed during these surveys, including American Black Duck, Canada Goose (*Branta canadensis*), and Common Merganser (*Mergus merganser*) (waterfowl); Bald Eagle and Northern Goshawk (*Accipiter gentilis*) (birds of prey); Downy Woodpecker (*Picoides pubescens*), Hairy Woodpecker (*Picoides villosus*), Northern Flicker (*Colaptes auratus*), and Pileated Woodpecker (*Dryocopus pileatus*) (woodpeckers); Ruffed Grouse (*Bonasa umbellus*) (upland game birds); and Herring Gull, Great Black-backed Gull, Ring-billed Gull (*Larus delawarensis*) and Killdeer (shorebirds).

The following priority species were identified at or near the Project Site during the breeding bird surveys:

- Boreal Chickadee – "Yellow" (NSDNR 2010);
- Canada Warbler – "Red" (NSDNR 2010), "Threatened" (COSEWIC 2012a), "Threatened" (SARA 2011);
- Eastern Wood-Pewee – "Yellow" (NSDNR 2010);
- Golden-crowned Kinglet – "Yellow" (NSDNR 2010);
- Gray Catbird – "Red" (NSDNR 2010);
- Gray Jay – "Yellow" (NSDNR 2010);
- Killdeer – "Yellow" (NSDNR 2010);
- Pine Siskin – "Yellow" (NSDNR 2010);
- Ruby-crowned Kinglet – "Yellow" (NSDNR 2010);
- Spotted Sandpiper – "Yellow" (NSDNR 2010);
- Tennessee Warbler – "Yellow" (NSDNR 2010);
- Tree Swallow – "Yellow" (NSDNR 2010); and
- Yellow-bellied Flycatcher – "Yellow" (NSDNR 2010).

Summary of Bird Surveys

The bird community in the vicinity of the Project site is strongly influenced by the proximity to the landfill associated with the Kaizer Meadow Environmental Management Centre. This feature is exploited as a food resource by a variety of scavenging species such as American Crow, Common Raven, and Herring Gull, and appears to attract a large number of these bird species in all seasons. The presence of the landfill also explains the large number of birds present near the Project site in the winter, when abundances are typically lower than in other seasons. In addition, water treatment ponds at this facility provide habitat for waterfowl species including American Black Duck and Mallard. The Project site itself lacks open bodies of water so it is unlikely that waterfowl use the site directly.

A mixed-woods treed swamp to the immediate west of the proposed turbine location does not appear to provide bird habitat that differs greatly from the surrounding area. However, it is likely that boreal wetland species such as the Boreal Chickadee and Gray Jay are attracted to a treed bog in the northeastern section of the Project site. The predominance of

upland forest habitat found at or near the Project site favours a variety of passerine and non-passerine birds, as well as mature forest species such as Pileated Woodpecker and Northern Goshawk.

It is expected that shorebirds and waterfowl may move between the landfill and water treatment ponds of the Kaizer Meadow Environmental Management Centre and several lakes located to the west of Highway 14, including Card Lake. Most notably, it is likely that large groups of gull species (i.e. Herring Gull) use this local flight path, which passes over the Project site.

There were 81 species identified at or near the Project site during surveys conducted throughout the year, including thrushes, sparrows, warblers, birds of prey, and other passerine and non-passerine species. In addition, 15 priority species were identified, suggesting that the general area may be composed of areas of useful to important bird habitat.

4.7.2 Bats

4.7.2.1 Desktop Review

Seven species of bat have been recorded in Nova Scotia (Broders et al. 2003) including:

- Little brown bat (*Myotis lucifugus*);
- Northern long-eared bat (*Myotis septentrionalis*);
- Big brown bat (*Eptesicus fuscus*);
- Red bat *(Lasiurus borealis*);
- Hoary bat (*Lasiurus cinereus*);
- Silver-haired bat (*Lasinycteris noctivagans*); and
- Tri-colored bat (*Perimyotis subflavus*).

Of these, only the Little brown bat, Northern long-eared bat, and the Tri-colored bat have known significant populations in Nova Scotia (Broders 2004).

Bat species in Nova Scotia are insectivorous (Randall 2011) and in general are most active shortly after sunset, although there is some variation in activity patterns among species (Broders et al. 2003). The most common resident species, the Little brown bat and the Northern-long eared bat, are typically active from May until August, at which time the two species return to caves and mine openings, referred to as hibernacula, and commence swarming behaviours prior to over-wintering. The Tri-colored bat also over-winters in the province and typically uses the same type of habitat, but less is known about its hibernating ecology. Other bat species, including the Hoary bat and the Silver-haired bat, migrate from the province in the fall months and over-winter in the southern United States (Mosely 2007a).

Although winter hibernacula provide a safe location to survive the winter months, the tendency of Little brown, Northern long-eared, and Tricolored bats to gather at these locations increases the species vulnerability to outbreaks of disease. One such example is White-Nose Syndrome (WNS); an infectious fungal disease caused by *Geomyces*

destructans that has resulted in the deaths of over one million bats in eastern North America (Hallam and McCracken 2010). This disease has spread to Atlantic Canada within the last two years, and constitutes a serious threat to bat populations in the region (Hebda 2012). Affected hibernacula can suffer 95-99% mortality (McBurney 2012), and at least two significant colonies in New Brunswick have endured collapses since the arrival of the disease in Atlantic Canada (Hebda 2012).

Information regarding the bat community in the vicinity of the Project site, including any SAR, was obtained through a combination of desktop review and field studies. The desktop component included a review of the Nova Scotia Significant Species and Habitat Database and ACCDC data on species recorded within a 100 km radius of the Project site, and the comparison of habitat mapping data (Section 4.4) to known habitat requirements for species expected to occur within the area and for all SAR.

Significant Species and Habitats Database

The Significant Species and Habitats database (NSDNR 2012a) indicates that multiple features related to bats and bat habitats are present within a 100 km radius of the Project site (Drawing 4.6; Table 4.18).

Table 4.18: Bat Records within 100km of the Project Site

Site #	Name	Feature	Distance to Project Site (km)
HN16	N/A	Karst Topography	31
HN284	Frenchman's Cave	Bat Hibernacula	31.1
HN131	N/A	Karst Topography	31.9
HN323	Miller's Creek Cave	Bat Hibernacula	34.9
HN36	Woodville Ice Cave	Bat Hibernacula	39.5
HN281	N/A	Little Brown Bat	46.9
HN282	Centre Rawdon Gold Mine	Bat Hibernacula	47.3
HX396	N/A	Little Brown Bat	49.6
HN279	N/A	Little Brown Bat	54.2
HN283	N/A	Little Brown Bat	58
HN5293	N/A	Gypsum sinkhole pond	60.7
HN305	N/A	Little Brown Bat	63.6
HN280	N/A	Little Brown Bat	67.8
HX121	Cave of the Bats	Bat Hibernacula	69.5
HN5065	Hayes Cave	Bat Hibernacula	78.4
CO112	N/A	Little Brown Bat	79.3
HX427	N/A	Little Brown Bat	80.4
CO116	N/A	Karst Topography	86.5
CO365	N/A	Little Brown Bat	94.7
HX390	N/A	Little Brown Bat	98.8

Source: NSDNR 2012b

There are also multiple Little brown bat records within 100 km of the Project site. At least two of these records are associated with known hibernacula (Londonderry Lear Shaft and Peddlar's Tunnel), but all are at least 50 km from the Project site.

ACCDC Database

Table 4.19 presents bat species recorded within a 100 km radius of the Project site, according to ACCDC.

Table 4.19: Bat Species Recorded within a 100 km Radius of the Project Site

Common Name	Scientific Name	NSDNR Status[1]	COSEWIC Status[2]	SARA Status[3]	NSESA Status[4]
Hoary bat	*Lasiurus cinereus*	Undetermined	Not Listed	Not Listed	Not Listed
Little brown bat	*Myotis lucifugus*	Yellow	Endangered	Not Listed	Not Listed
Northern long-eared bat	*Myotis septentrionalis*	Yellow	Endangered	Not Listed	Not Listed
Tri-colored bat	*Perimyotis subflavus*	Yellow	Endangered	Not Listed	Not Listed

Source: ACCDC 2012

[1] NSNDR 2010; [2] COSEWIC 2012a; [3] SARA 2011; [4] NSESA 2007

4.7.2.2 Field Data

Field surveys of bat populations at an adjacent site were carried out from August to September 2011 by McCallum Environmental Ltd. (2012). Survey methods included the deployment of four AnaBat SD1 Detectors. The AnaBat system records echolocation sounds made by the bats when flying near the detector which are then downloaded into Analook software and, where possible, are interpreted into species and number of passes. AnaBat detectors were deployed at the following distances in reference to the proposed Kaizer Meadow turbine location:

Table 4.20: AnaBat Deployment Information

AnaBat Detector	Distance from Project Site	Deployment Period
I	6.7 km north	August 15 – 20, 2012 August 25 – September 14, 2012
II	8.1 km northwest	August 15 – 26, 2012
III	10.1 km northwest	August 14 – 15, 2012 August 19 – September 29, 2012
IV	6.6 km northwest	August 14 – September 29, 2012

Detectors were set to record between 1900 and 0630 daily in order to capture as many bat passes as possible. Each distinct call or pass was recorded as a single file and data was downloaded every four to seven days during the sampling period.

For the purpose of the Kaizer Meadow Project site, the nearest detectors (AnaBat I and IV) will be discussed.

The majority of calls were associated with *Myotis* species (e.g. little brown bat *Myotis lucifugus* and northern long-eared bat *Myotis septentrionalis*), both of which are common species in Nova Scotia. A high percentage (34%) of calls were classified as unknown species (bat generated but background noise and call quality made identification challenging).

Table 4.21 presents a summary of bat acoustic survey results.

Table 4.21: Summary of Bat Acoustic Survey Results

Deployment	AnaBat I	AnaBat IV	Totals
Habitat	Forest edge	Trail, 10-15 year regrowth	
Myotis	696	878	**1574**
Non-*Myotis*	3	0	**3**
Other species	Silver haired bat *(Lasionycterisnoctivigans)*	0	**1**
Unknown species	696	197	**893**
Total Passes	1396	1075	**2471**
% unknown species	49%	18%	**34%**
Total nights	27	45	**72**
% passes per night	51.7%	23.9%	

Species at Risk Analysis
Bat species that have been recorded within a 100 km radius of the Project site were screened against the criteria outlined in the "Guide to Addressing Wildlife Species and Habitat in an EA Registration Document" (NSE 2005) to develop a list of priority species. These priority bat species include:

- Little brown bat – "Yellow" (NSDNR 2010), "Endangered" (COSEWIC 2012a);
- Northern long-eared bat – "Yellow" (NSDNR 2010), "Endangered" (COSEWIC 2012a); and
- Tri-colored bat – "Yellow" (NSDNR 2010), "Endangered" (COSEWIC 2012a)

The Little brown bat is the most common species in Nova Scotia, and is probably ubiquitous in the province (Broders et al. 2003). This species' range extends throughout most of North America. The species is an effective feeder on patches of insects (Fenton and Barclay 1980) and will prey heavily upon aquatic insects, particularly chironomids (Belwood and Fenton 1976), explaining the tendency to observe this species in close association with water. During the day, the Little brown bat will roost in buildings, trees, under rocks, in wood piles, and in caves, congregating in tight spaces to roost at night (Fenton and Barclay 1980). Populations of Little brown bat are thought to be limited by roost availability rather than food supply (Fenton and Barclay 1980).

As a non-migratory species, the Little brown bat hibernates from September to early or mid-May in abandoned mines or caves (Fenton and Barclay 1980; Mosely 2007a). Disturbance of hibernating individuals is thought to be a contributing factor in the decline of Little brown bat populations in some parts of its range (Fenton and Barclay 1980), as human intrusion

into winter hibernacula causes a measurable increase in bat activity, leading to increased risks of mortality from premature depletion of fat reserves (Thomas 1995).

The Little brown bat was designated as "Endangered" by COSEWIC in an emergency assessment in February 2012, based upon the predicted functional extirpation of the species within three generations as WNS spreads throughout the region (2012b).
The Tri-colored bat, formerly known as the Eastern pipistrelle, is frequently observed in Nova Scotia but has a restricted distribution focused in the interior of the southwest region of the province (Farrow and Broders 2011). Research conducted at Kejimkujik National Park found the Tri-colored bat to be locally abundant, and results indicate that this population may represent the only breeding population of the species in Canada (Broders et al. 2003). In the summer months, the Tri-colored bat is concentrated in a geographic area bounded by Wolfville to the west, Halifax to the northeast, and Shelburne to the southeast (Quinn and Broders 2007). The species occurs throughout most of eastern North America, with Nova Scotia representing the northeastern extent of its range (Fujita and Kunz 1984).

The Tri-colored bat requires clumps of *Usnea* lichen for roosting; a habitat feature typically associated with mature spruce and balsam fir trees (Farrow 2007). This association suggests that the species may be negatively impacted by intensive forestry practices that remove roosting habitat (Farrow 2007). The species typically forages over water bodies, but also feeds over tree canopies (reviewed by Quinn and Broders 2007) and it appears that, unlike the Little brown bat, the Tri-colored bat stays active throughout the night, possibly as a means to reduce intraspecific competition (Broders et al. 2003). This species is non-migratory, and generally hibernates alone, or in small numbers, in caves or abandoned mines where it appears to show a preference for small side passages, rather than main passages (Fujita and Kunz 1984; Mosely 2007a). Individuals show strong fidelity to specific hibernacula, although in Nova Scotia only 10 hibernating individuals have ever been recorded (Quinn and Broders 2007).

The Tri-colored bat was designated as "Endangered" by COSEWIC in an emergency assessment in February 2012, based upon the predicted functional extirpation of the species within three generations as WNS spreads throughout the region. It is suspected that much of the Canadian Tri-colored bat population has already been affected by WNS and that the remainder will be affected within the next several years (COSEWIC 2012d).

The Northern-long eared bat, although once considered uncommon throughout Nova Scotia (Mosely 2007a), is likely ubiquitous in the forested regions of the province (Broders et al. 2003). This species is widely distributed in the eastern United States and Canada, and is commonly encountered during swarming and hibernation (Caceres and Barclay 2000). As a forest dweller, this species feeds primarily on butterflies and moths, beetles, Nueroptids, aphids, and flies, and it is also known to employ a gleaning foraging strategy as opposed to relying strictly on aerial pursuit of prey (as cited in Caceres and Barclay 2000). During the day, Northern long-eared bats show a preference for roosting in trees, the characteristics of which have been shown to vary according to the reproductive status of bred females (Garroway and Broders 2008). Females appear to prefer shade tolerant deciduous trees over coniferous trees, whereas males roost solitarily in coniferous or mixed-stands in mid-

decay stages (Broders and Forbes 2004). Northern long-eared bats are also non-migratory and are typically associated with the Little brown bat during hibernation, in caves or abandoned mines (Mosely 2007a). Hibernation in this species is thought to begin as early as September and can last until May (as cited in Caceres and Barclay 2000).

The Northern long-eared bat was designated as "Endangered" by COSEWIC in an emergency assessment in February 2012, based upon the predicted functional extirpation of the species within two to three generations as WNS spreads throughout the region (COSEWIC 2012c).

Positive identification of the unknown species in the field survey conducted by McCallum Environmental Ltd. (2012) would have required visual data such that is recorded during trapping and handling. This survey is a snapshot in time and species not identified during this time period may move through the site at various other times of the year.

4.7.3 Effects and Mitigation

4.7.3.1 Avifauna

The effects of a wind farm on birds are variable and depend on factors such as the development design, topography of the area, habitats affected, and the bird community in the wind farm area (Drewitt and Langston 2006). Potential effects include:

- mortality resulting from direct collision;
- habitat alteration; and
- sensory disturbance.

Collision Mortality

The most overt potential effect of the Project on birds is direct mortality resulting from collision with Project infrastructure, namely turbine blades. Most evidence suggests that mortality levels resulting from turbine collisions are low (as cited in Drewitt and Langston 2006) although many studies do not adequately incorporate carcass removal by scavengers into mortality estimates. In a review of night migrant fatalities at wind farm sites in North America, Kerlinger et al. (2010) found fatality rates of less than 1 bird/turbine/year to approximately 7 birds/turbine/year, even with corrections made for scavenger removal and searcher efficiency. Furthermore, multi-bird fatality events, in which more than three birds were killed at a turbine site in a single night, were found to be rare and may have been related to lighting and/or inclement weather (Kerlinger et al. 2010).

Collision risk is greater on or near areas used by large numbers of foraging or roosting birds or in important migratory flyways (Drewitt and Langston 2006). This risk can therefore be greatly reduced by incorporating knowledge of the area's bird community into the design and placement of a wind power project and the design and placement of the individual turbines. A few large-scale wind farms constructed in the 1980's, specifically at Altamont Pass and Tehachapi Pass in California, did not adequately consider local factors and the result was the death of dozens of birds, with a high proportion of iconic raptor species (Kingsley and Whittam 2005). The probability of raptor collision with wind turbines depends on the species, turbine height, and local

topography (de Lucas 2008); considerations which when included in the planning stages can reduce the risk of raptor collisions. In the review by Kingsley and Whittam (2005), raptor collision rates were found to be quite low.

In summary, available research suggests that the probability of large-scale fatality events occurring at wind farms is extremely low (Kerlinger et al., 2010) and the observed mortality caused by wind energy facilities is low compared to other sources of human caused bird mortality (i.e. buildings, communications towers, vehicles, etc.) (Kingsley and Whittam 2005). Baseline information gained from avian surveys can be combined with site specific considerations to greatly reduce the already low risk of bird collisions.

Habitat Alteration

Habitat alterations occurring as a result of wind energy developments also have the potential to impact bird populations. However, impacts are considered less severe than those from other energy extraction developments such as oil and gas exploration because the disturbance is limited to the construction footprint (turbine pads, roads, associated buildings, etc.) (Kuvlevsky et al. 2007). The magnitude of these impacts, however, may be magnified if the disturbed area contains sensitive plant communities that provide critical habitat to local bird populations (Kuvlevsky et al. 2007). Site clearing and preparation may involve the removal of key habitat features, such as standing deadwood, mature trees, or shrub cover required as foraging and/or breeding habitat for certain bird species. Depending on the availability of nearby alternative habitat, habitat alterations associated with wind energy infrastructure may have detrimental effects on local bird populations.

Sensory Disturbance

Sensory disturbance to birds can occur during both the construction, and operational and maintenance phases of wind power projects, and can be caused by the increased presence of personnel, vehicle movement, operation of heavy equipment, and the operation of the turbines themselves (Drewitt and Langston 2006). It is thought that disturbance to birds may have a greater population impact than collisions themselves, although research is lacking in this area (Kingsley and Whittam 2005). Primary concerns with regards to sensory disturbance are related to displacement and potential effects on key physiological processes such as breeding.

Some studies have shown that birds will exhibit avoidance behaviours post-construction, leading to a variable degree of displacement from previously used habitat (reviewed in Drewitt and Langston 2006) which essentially amounts to habitat loss. In most cases, such displacement is on the scale of tens to hundreds of metres, which can lead to localized changes in bird densities (Leddy et al.1999; Pearce-Higgins et al. 2009). However, while birds may avoid specific sites, the evidence does not suggest that birds abandon the general area as a whole. Other research indicates that the presence of wind turbines has no effect on the distribution of the bird community (Devereux et al., 2008). The tolerance to Project related disturbance may be species specific but may also be related to the availability of alternative habitat (Kingsley and Whittam 2005). Thus, careful site selection of turbines to avoid unique habitat types will likely alleviate disturbance and/or displacement concerns, especially during the operational phase of the Project.

4.7.3.2 Bats

Similarly, the installation of wind turbines has the potential to impact bats both directly and indirectly (Arnett et al. 2007). Impacts include:

- mortality resulting from direct collision and/or barotrauma;
- habitat alteration; and
- sensory disturbance.

The significance of these impacts at the population level depends on a number of biotic and abiotic variables, including the number of individuals affected and the stability of the population, season, physiologic condition of the individuals affected, and weather factors.

Collision Mortality

The most direct manner in which bats are affected by wind farms is by collision with turbine blades, which can result in large-scale mortalities (Kuvlevsky et al. 2007). However, recent research has determined that a large proportion of bat mortalities at wind-energy facilities are a result of barotrauma (Baerwald et al. 2008). Barotrauma is characterized by a drop in atmospheric pressure along the top of a rotating turbine blade, which causes thoracic, abdominal, and pulmonary injury to bats when passing through the low pressure area (Baerwald et al. 2008). Necropsy of recovered carcasses found that the cause of death for bats killed at wind-energy facilities is an indiscernible combination of direct collision and barotrauma (Grodksy et al. 2011).

Much of the established literature has not attempted to elucidate the causes of bat mortality and has instead reported on the magnitude of mortalities. Regardless of the specific cause, large numbers of bat fatalities have been reported at wind energy facilities, particularly along forested ridgetops, in the eastern United States (Kunz et al. 2007). Since bats are long-lived and have low reproductive rates, such mortalities can potentially contribute to precipitous population decline, and can increase the risk of local extinctions (Arnett et al. 2007).

Research suggests that migratory tree-roosting species suffer the highest fatalities at wind farms (Kunz et al. 2007; Kuvlevsky et al. 2007; Cryan and Barclay 2009), although deaths of Tri-colored bats constituted 25.4% of total bat fatalities at wind facilities in the eastern United States (as cited in Arnett et al. 2007). Most bat fatalities are reported in the late summer months (Johnson 2005) coinciding with the start of autumn migration (Arnett et al. 2007). Periods of high mortality may be linked with the timing of large-scale insect migrations when bats feed at altitudes consistent with wind turbine heights (Rydell et al. 2010). It has been found that bat fatalities increase exponentially with wind tower height, with turbine towers 65 m or taller having the highest fatality rates (Barclay et al. 2007). This hypothesis is also supported by the findings of Horn et al. (2008), who reported that bats were not being struck by turbine blades when flying in a straight line en route to another destination, but were struck while foraging in and around the rotor-swept zone of the turbine.

Temporal variation in bat activity and subsequent fatality rates can be influenced by weather variables, as well as the characteristics of the facility (Baerwald and Barclay 2011). Although bats exhibit species-specific responses to environmental variables (Baerwald and Barclay

2011), in general they appear to be more active when wind speeds are low, which increases the risk of collisions with rotating turbine blades (Arnett et al. 2007) and mortality resulting from barotrauma. Increasing the turbine cut-in speed, the minimum wind speed at which the turbine blades are permitted to begin rotating, has been shown to greatly reduce bat fatality because bats are less active at these wind speeds (Arnett et al. 2011).

Habitat Alteration

The construction and operation of wind-energy facilities create habitat alteration and disturbance through various means including vegetation clearing, soil disruption, and noise (NRC 2007), thereby indirectly impacting bats (Arnett et al. 2007). The removal of trees during the site clearing and preparation phases can be especially detrimental, particularly to those bat species which use trees as roosting habitat (Arnett et al. 2007).

Some studies, however, suggest that habitat changes related to wind power developments, may in fact create benefits to bats by increasing cleared areas and creating access roads, both of which can be used by bats as foraging habitat (as cited in Arnett et al. 2007; Kunz et al. 2007). In relation to this, small-scale disturbances, including creating small cutblocks or small scale access roads through forested habitat, have been shown to stimulate an increase in bat activity relative to previous years (Grindal and Brigham 1998). It is important to note, however, that increases in bat activity may subsequently increase the risk of bat mortality.

Sensory Disturbance

Increased human presence may disturb roosting bats (Arnett et al. 2007), but it is unknown if this disturbance is sufficient to disrupt normal behaviour or physiology. During hibernation, bats are sensitive to human presence, and human intrusion into hibernacula can lead to increased arousals leading to a premature depletion of fat reserves (Thomas 1995). Siting wind-energy facilities away from hibernacula is therefore recommended in the design phases of these projects.

It is unknown if noise associated with turbine operation has any measureable effect on bats, although it is thought that bats may become acoustically disoriented by the low-frequency noise emitted from rotating turbines (Kunz et al. 2007). Bats have been shown, experimentally, to avoid foraging in areas with intense, broadband noise (Schaub et al. 2008), however this research was not conducted in the context of wind-energy development and other studies indicate that bats have been shown to forage in close proximity to operational turbines (Horn et al. 2008).

Potential effects to birds and bats, during the different phases of the Project, are summarized in Table 4.22.

Table 4.22: Potential Environmental Effects of the Project on Avifauna and Bats

Effect	Source of Effect	*Phase Applicable to		
		C	O/M	D
Direct mortality	Collisions (and risk of barotrauma) with Project infrastructure		✔	
Disruption to breeding and nesting	Noise, vibration, and/or visual disturbance from site personnel, equipment, and/or turbines; habitat loss	✔	✔	✔
Disruption to roosting and feeding	Noise, vibration, equipment, and/or turbines; habitat loss	✔	✔	✔
Displacement	Noise, vibration, and/or visual disturbance from site personnel, equipment, and/or turbines; alteration of migration flyways or local flight paths	✔	✔	
Habitat loss and fragmentation	Clearing of vegetation for Project infrastructure; hydrologic alterations leading to wetland loss	✔	✔	

The following mitigative measures will be implemented to minimize or eliminate impacts to the birds and bats:

- Clearing of site vegetation will be conducted outside of the breeding and nesting season for the area's birds (April to August). If not possible, a qualified biologist will conduct nest searches in the work area(s) prior to the commencement of work, and identified nests (complete with appropriate buffers) will be avoided.
- Use existing access roads to the greatest extent possible.
- Limit the use of lighting on turbine hubs and blades to the minimum as required by Transport Canada (2012).
- Avoid placing Project infrastructure in habitats significant to bird species as identified through the Project avian surveys. These include wetlands, lakeshores, mature forests and areas with large, hollow trees, and along ridge lines.
- If required, post-construction monitoring should be implemented under direction from NSE and in consultation with CWS and NSDNR.

Potential impacts to avifauna and bats will be further evaluated, as a VEC, in Section 8.

5.0 SOCIO-ECONOMIC CONDITIONS AND EFFECTS MANAGEMENT

5.1 Economy

The Project site is located in Lunenburg County in the Municipality of the District of Chester. The area around the Project site is sparsely populated by the small communities of Sherwood (approximately 3.8 km to the west), Chester (approximately 20 km to the south), and Upper Vaughan (approximately 8.3 km to the north). The largest towns in Lunenburg County include Bridgewater (population 7,944), Lunenburg (population 2,312), Chester (population 2,292), New Ross (population 1,700), and Mahone Bay (population 904) (Statistics Canada 2006).

The Project benefits include utilization of local construction services and labourers and will enhance the reputation of the Kaizer Meadow Environmental Management Centre as an environmental leader.

5.1.1 Demography

Population has declined in Lunenburg County and the Municipality of the District of Chester. This trend is in contrast to a 3.8% population growth in the Halifax Regional Municipality (HRM) (Statistics Canada 2006), and is likely a result of rural-urban migration towards greater employment opportunities in the HRM. Population statistics for these areas is provided in Table 5.1.

Table 5.1: Population Statistics for Lunenburg County and Municipality of the District of Chester and West Hants

Population Statistics	Lunenburg County	Municipality of the District of Chester
Population in 2006	47,150	10,741
Population in 2001	47,591	10,781
Population change from 2001-2006 (%)	-0.9	-0.4
Total private dwellings in 2006	24,786	6,161
Land area (square km)	2,907.93	1,120.75
Population density per square kilometer	16.2	9.6

Source: Statistics Canada 2006

The age distribution in Lunenburg County and the Municipality of the District of Chester reveals an older population (Table 5.2). The median age in these two area is 46 and 46.5 years, respectively, compared to the province overall (41.8), and HRM (39.0) (Statistics Canada 2006).

Table 5.2: Age Distribution for Lunenburg County and the Municipality of the District of Chester

Age Statistics	Lunenburg County	Municipality of the District of Chester
0 - 14 years	6,555 (13.9%)	1,510 (14.1%)
15 - 64 years	31,645 (67.1%)	7,215 (67.2%)
65+ years	8,950 (19%)	2,020 (18.8%)
Total Population	**47,150 (100%)**	**10,470 (100%)**

Source: Statistics Canada 2006

5.1.2 Public Usage Areas and Health Care and Emergency Services

Public usage areas near the Project site consist of a Provincial Picnic Park at Card Lake, a Rotary Kids Camp on Mockingee Lake, and a Community Hall in Upper Vaughan.

The Town of Windsor (approximately 35 km from the Project site) and the nearby community of Vaughan have fire halls on Highway 14, and the Municipality of the District of Chester has seven volunteer fire departments. The volunteer fire departments offer fire, medical, first response, motor vehicle collision, and water rescue services (Municipality of the District of Chester Fire and Emergency Response 2011). High-angle rescue services are offered by fire departments in HRM and Kentville. Health services in the region include South Shore Health providing hospital-based services to Lunenburg and Queens Counties, the Hants Community Hospital (Capital Health) in Windsor, and the Chester Community Clinic (South Shore Health 2011; Capital Health n.d.).

5.1.3 Labour and Employment Rates

Employment and unemployment rates for January 2012 in the Southern Economic Region (includes Lunenburg County) indicate that unemployment in this region, at 9.7%, was higher than the provincial average (8.2%) (Statistics Canada 2012). With regard to employment rates, the Southern Economic Region had a lower rate, at 53.5%, than the province (57.9%) (Statistics Canada 2012).

A review of businesses located in close proximity to the Project site is outlined in Table 5.3 below and reveals few existing businesses.

Table 5.3: Local Businesses and Proximity to Project Site

Business	Distance and direction to Project
Kaizer Meadow Environmental Management Centre	1.2 km east, on Kaizer Meadow Road
Rainbow Net and Rigging Limited (fishing equipment cleaning)	1.2 km east, on Kaizer Meadow Road
Sherwood Golf Course	5.1 km west, off Highway 14
Lakeside Variety - Irving gas station, KwikWay convenience store and NSLC	12.7 km north, on corner of Highway 14 and New Ross Road
Falls Lake Resort (build, buy, rent cottages) and Falls Lake Department of National Defense Recreation Centre	14.4 km north, off New Ross Road

The primary economic sector in the area immediately surrounding the proposed Project site is forestry and Christmas tree farming, as well as, but to a lesser extent, cottage tourism, hunting, and fishing.

The largest community within close proximity to the Project is Chester (population 2,292), approximately 22 km south of the Project. Businesses of interest in Chester include food and dining services, accommodations (bed and breakfasts, hotels, campgrounds), shops and art galleries, recreation (e.g. marinas and boating), as well as manufacturing, consulting, and contracting activities.

The highest proportion of the experienced labour force in both Lunenburg County and the Municipality of the District of Chester work in manufacturing (17.3% and 17.2%) (Table 5.4). Manufacturing ranks high due to marine manufacturing, shipbuilding, machine shops, metal works, production of house building materials, plastics, and aerospace businesses in Chester and Lunenburg (Town of Lunenburg 2012; Chester Area NS 2010a).

It is important to note that industry categories in the 2006 Census appear to separate activities that would fall under the category of "tourism services", notably categories such as "retail trade", "accommodation and food services", "arts, entertainment and recreation", and "information and cultural industries". If these categories were grouped together under "tourism services", they would make up the largest proportion of the labour force in Lunenburg County (21.2%) and the Municipality of the District of Chester (19.9%).

Table 5.4: Labour Force by Industry in Lunenburg County and the Municipality of the District of Chester

Industry	Total Lunenburg County	Total Municipality of the District of Chester
Total experienced labour force 15 years +	21,495	4,860
Manufacturing	3,715	840
Retail trade	2,740	505
Health care and social assistance	2,385	555
Construction	1,765	550
Agriculture, forestry, fishing and hunting	1,435	230
Accommodation and food services	1,250	255
Administrative support, waste management and remediation services	1,175	220
Education services	1,150	275
Public administration	1,135	290
Other services	985	190
Professional, scientific and technical services	695	205
Transportation and warehousing	645	125
Wholesale trade	630	185
Arts, entertainment and recreation	475	130
Finance and insurance	440	110
Information and cultural industries	365	80

Industry	Total Lunenburg County	Total Municipality of the District of Chester
Real Estate	305	50
Mining and oil and gas extraction	115	40
Utilities	80	15

Source: Statistics Canada 2006

5.1.4 Economic Effects and Mitigation

Economic effects as a result of the Project will include job creation and increased revenue for municipalities.

The types of jobs created will consist of:

- Direct employment involved in construction, operations, and maintenance activities;
- Indirect employment consisting of supplied commodities and services to the Project (i.e. turbine tower manufacturing); and
- Induced employment derived from the spending of those directly and indirectly employed by the wind farm (Gagnon et al. 2009).

Further, specific skills required for the Project include trades, such as electricians, welders, heavy machine operators, cement and aggregate extraction and production workers, truck drivers, crane operators, labourers, engineers, and scientists. Local resources will be sourced to the greatest extent possible and economically feasible. Since manufacturing and construction are major sectors in Lunenburg County, it is expected that resources will be readily available within the surrounding communities. Due to Project proximity to Halifax, professional services from scientists, engineers, and large general contractors would be easily accessible.

As outlined in the *Wind Turbine Facilities Municipal Taxation Act*, municipalities will receive tax revenues per MW on an annual basis and as such, the royalty will annually increase as the Consumer Price Index (CPI) rises (Nova Scotia Government 2006). Based on a 2% annual increase in CPI, the $5,500/MW wind turbine facility tax rate from 2006-2007 would increase to approximately $6,468 at the Project's commissioning in 2013.

Although small, the Project is expected to have an overall positive effect on the local economy, and as such, this VEC is not further assessed.

5.2 Land Use and Value

5.2.1 Existing Land Use and Value

Presently, the area surrounding the Project site is primarily used for forestry/Christmas tree farming, as well as activities associated with the Kaizer Meadow Environmental Management Centre which has three main components:

1. an Eco Park for green business (in development);

2. a Training and Research Centre for environmental innovation and education (in development); and
3. a Solid Waste Management Facility.

There are 11 buildings located within 2 km of the Project site, none of which are residences. Average housing costs for Lunenburg County and the Municipality of the District of Chester are provided in Table 5.5.

Table 5.5: Housing Costs

Jurisdictions	Average Housing Cost	Median Earnings
Lunenburg County	$173,183	$34,802
Municipality of the District of Chester	$209,559	$38,710
Province of Nova Scotia	$158,000	$36,917

Source: Statistics Canada 2006

5.2.2 Land Use and Value Effects and Mitigation

The impact of wind farms on property values is a local concern. Recently, media coverage in Canada, especially from Ontario, has raised concerns about reduced property values as a result of nearby wind farm developments. The claims are a result of perceived ill environmental and health effects as well as the visual esthetics of turbines. It is important to note that a person's desire to live near a wind farm is completely subjective making it difficult to generalize wind development impacts on property values. Notably, few peer-reviewed, comprehensive, and statistically rigorous studies have been conducted on the effect of wind developments on property values, signaling a need for more research on the topic.

One study of wind development proximity and property values shows that before project approval, property values decreased as a result of fear of unknown effects, known as *anticipation stigma*; however, once operational, property values rebounded due to a greater understanding of wind development effects (Hinman 2010). As a result, Hinman (2010) refutes the existence of *wind farm area stigma theory* and emphasizes that no general conclusions be made from studies on this topic, simply that findings should be interpreted as site-specific. The most comprehensive study of the impact of wind farms on property values was completed by Hoen et al. (2009) where residential home sales near 24 wind developments were examined. Using various methods of analysis, the authors found no impact on property values as a result of *area stigma*, *scenic stigma*, or *nuisance stigma* in relation to wind farms (Hoen et al. 2009). This study also points to the shortcomings of several studies, notably regarding statistical methods and data gathering, small study samples, few site visits, as well as the fact that only two peer-reviewed studies have been published in academic journals on this topic (Hoen et al. 2009). The study ultimately states that no widespread and statistically observable impact can be drawn, indicating the complete subjectivity of a person's decision to live near a wind development (Hoen et al. 2009).

Ultimately, each wind development is different, making it difficult to accurately predict effects on property values for those residing near the Project. However, where this Project consists of one turbine, is located adjacent to an existing solid waste facility, and is greater than 2.0

km from any existing residence, negative impacts on residential property values are not anticipated. Therefore, land use is not further assessed.

5.3 Recreation and Tourism

5.3.1 Existing and Planned Recreation and Tourism

Existing outdoor recreation in the area includes hunting, fishing (i.e. trout fishing in Card Lake), snowmobiling, ATV use, and hiking and boating (non-motorized) along trails and waterways near Card Lake Provincial Park (Trail Peak 2010). There are wildlife associations serving the area, notably the Hants West Wildlife Association in Hantsport, the Lunenburg County Wildlife Association, the Lunenburg Rod and Gun Club, and the Big Game Society of Nova Scotia in Windsor (Nova Scotia Federation of Anglers and Hunters 2012). For hiking, New Ross offers the New Ross Community Trail and the New Ross Lions Park near Ross Farm Museum on Highway #12 (Chester Area NS 2010b; Trail Peak 2010). The area is also home to the Shore Riders ATV Club in Chester Basin and the Hants Sno-Dusters snowmobiler club in Falmouth (Shore Riders ATV Club 2012; Hants Sno-Dusters 2011). The 2010 Nova Scotia Visitor Exit Survey Community Report outlines the total trips (stopped or stayed) to communities and tourist regions, as well as capture rates of communities within tourist regions (NSDERDT 2011). The communities of Chester, Hubbards, Lunenburg, Mahone Bay, and New Ross are designated as the South Shore Region. Table 5.6 shows the total trips (stopped or stayed) that were made to these communities as well as the capture rate [percentage of parties that stopped in a community (short stay or overnight) out of the total number of parties who visited the tourism region].

Table 5.6: Communities Visited in Nova Scotia (2010)

Region/Community	Total Trips (% who stopped or stayed)	Capture Rate (%)
South Shore	27%	
Hubbards	1%	4%
Chester	7%	24%
Mahone Bay	11%	42%
Lunenburg	13%	49%
New Ross	0%	2%

Source: NSDERDT 2011

The data shows tourism in Hubbards and New Ross is not a major economic driver. Although New Ross is home to the Ross Farm Museum, there are no hotels, motels, or bed and breakfasts to accommodate overnight tourists. Comparatively, communities such as Chester, Mahone Bay, and Lunenburg were more popular destinations. While visiting the area closest to the Project site, the primary tourism activity appears to be cottage vacationing and lake activities.

5.3.2 Recreation and Tourism Effects and Mitigation

The popular tourist communities of Chester, Mahone Bay, and Lunenburg are not located close enough to the Project site (minimum distance of 22 km away) to have tourism sectors negatively affected by construction and operation.

A 2002 study from MORI (Market & Opinion Research International) interviewed tourists visiting Argyll and Bute, Scotland and asked them about their attitudes towards the presence of wind farms in the area. Of those who knew about the surrounding wind farms (40% of those interviewed), 43% felt that wind farms had a positive effect on the area, 43% felt it made no difference, and 8% felt it had a negative effect (MORI 2002).

It is difficult to determine with certainty how tourists will react to a wind development; however, Project construction likely will not negatively impact larger tourist centers such as Chester, Mahone Bay, and Lunenburg.

No impacts are expected to the broader recreational community in the area and the turbine is expected to be located at the current met tower location, directly off of an existing road that services the solid waste management facility. Therefore, recreation and tourism are not further assessed.

5.4 Human Health

There are some occupational health and safety concerns with wind developments, including shadow flicker, electromagnetic fields (EMFs), air quality, and ice throw/shedding.

5.4.1 Shadow Flicker

Shadow flicker can occur when rotating blades cast flickering shadows during times of direct sunlight. The magnitude of shadow flicker is determined by the position and height of the sun, wind speed and direction, geographical location, time of year, cloud cover, turbine hub height and rotor diameter, and proximity to the turbine (CanWEA 2011).

For shadow flicker to occur, the following criteria must be met:

1. The sun must be shining and not be obscured by clouds/fog.
2. The source turbine must be operating.
3. The wind turbine must be situated between the sun and the shadow receptor.
4. The wind turbine must be facing directly towards, or away from, the sun such that the rotational plane of the blades (rotor plane) is perpendicular to the azimuth of incident sun rays. For this to occur, the wind direction would have to perpetually be parallel to the azimuth of the incident sun rays throughout the day.
5. The line of sight between the turbine and the shadow receptor must be clear. Light-impermeable obstacles, such as vegetation, tall structures, etc., will prevent shadow flicker from occurring at the receptor.
6. The shadow receptor has to be close enough to the turbine to be in the shadow.

A shadow flicker assessment was completed for the proposed Project to assess the potential impact on surrounding shadow receptors. The analysis was conducted using the WindPRO version 2.8 software package.

A list of 11 potential receptors, within 2 km of the Project site (Appendix C), was developed using GIS data from the Nova Scotia Geomatics Centre and aerial imagery. For modelling purposes, the receptor list is considered to be conservative as no distinction has been made between habitable dwellings and barns, sheds, or outbuildings. Calculations were based on worst case scenarios including the following conditions:

- the sun is shining over the entire day, from sunrise to sunset;
- the rotor plane is always perpendicular to the line from the turbine to the sun; and
- the turbine is in constant operation mode.

Based on the modelling results (Appendix C), all receptors are predicted to comply with the industry standard of no more than 30 minutes of shadow flicker on the worst day, and no more than 30 hours of shadow flicker per year (Drawing 5.1). Receptor R10 (associated with the Kaizer Meadow Environmental Management Centre), located approximately 1,162 m from the proposed turbine location, is expected to experience the most shadow flicker; with a maximum of 18 minutes per day and 15:32 hours per year.

5.4.2 Electromagnetic Fields

EMFs are created by a combination of an electrical charge and a magnetic field which can occur naturally or as a result of human activities (i.e. cell phone usage, radio towers). According to CanWEA (2011), there are four potential sources of EMFs associated with wind energy developments:

- the associated transmission line,
- wind turbine generators,
- generator transformers, and
- underground cables.

The World Health Organization (WHO) and Health Canada have released guidelines that address the effects of EMF's on human health. Both of these organizations came to the following similar conclusions:

- The evidence that EMF's may contribute to an increased risk of cancer is very weak, but not negligible.
- There is little to no evidence to suggest that EMF's contribute to other health effects, such as cardiovascular disorders, reproductive dysfunction, or neurobehavioral effects.

Both the WHO and Health Canada state that no necessary action is needed to protect the public from chronic exposure to EMF's at low frequencies due to the relatively benign health effects (WHO 2007; Health Canada 2010b).

Dam Bay

Highway 14

Anderson Lake

Card Lake

Kaizer Meadow Road

Landfill

Highway 14

Notes:

1. Reference: Digital topographic Mapping by Nova Scotia Geomatics Centre.
2. Projection: NAD83(CSRS), UTM Zone 20 North.

Legend:

- Proposed Turbine Location
- Receptor Location
- Project Site Boundary
- Proposed Road
- Existing Paved Road
- Exlsting Trail / Access Road
- Mapped Stream
- Indefinite Stream
- Mapped Water Bodies
- Mapped Wet Area
- Cleared Area

Shadow Flicker Analysis (Hours Per Year)

- 0.00 - 10.00
- 10.00 - 30.00
- 30.00 - 100.00
- 100.00 - 300.00

Shadow Flicker Assessment

MUNICIPALITY OF THE DISTRICT OF CHESTER

MINAS BASIN

Strum ENVIRONMENTAL

DATE:	PROJECT #:
June 2012	12-4360
SCALE: 1:15,000	DRAWING #: **5.1**
DRAWN BY: H. Serhan	
CHECKED BY: A. Walter	

5.4.3 Air Quality

Although wind turbines do not produce harmful emissions, dust may affect local air quality during construction of the wind development. Equipment and trucks may also contribute to the creation of dust and vehicular emissions on site during both construction and operations and maintenance.

5.4.4 Ice Throw and Ice Shedding

Ice throw can occur when ice accumulates on turbine blades and is thrown off while the turbine is operational. Ice shed occurs when ice falls off an idling turbine. Both events can pose a safety hazard to people and equipment on-site. Ice can be thrown as far as 100 m and very seldom will the distance exceed twice the total height of the turbine (tower height plus blade length). With proper setbacks and on-sight safety awareness, hazards are minimized (Colby 2008; Mass. DEP & MBPH 2012). A study for the Chatam-Kent Public Health Unit cites Chatam-Kent's minimum setback regulation of 250 m from a residential dwelling and 600 m from residential or institutional zone as generally being sufficient to attain a safe level of incident probability (Colby 2008). Typically, during periods of icing, the turbine will detect the ice and automatically shut off, allowing ice to melt and directly fall off instead of being thrown (CanWEA 2011).

5.4.5 Human Health Effects and Mitigation

Based on the predictive shadow flicker modelling, the expected worst case results at all receptor locations are significantly less than the industry standards used for this assessment. Therefore, no mitigation related to shadow flicker is recommended.

No mitigation is required for EMFs as wind turbines are not a significant source of EMFs, have few negative health effects (WHO 2007; Health Canada 2010b; CanWEA 2011; SCENIHR 2007), and the Project uses only one turbine.
Dust control measures will be used to mitigate air quality issues during the construction phase. Equipment will be properly maintained to reduce vehicular emissions during operation and maintenance.

The Project site is anticipating minimal ice occurrence. If icing conditions are detected during operation, the turbine would automatically shut off, thus mitigating serious hazards from ice throw. As recommended in a study conducted for the Massachusetts Department of Environmental Protection (2012), signage will be placed on-site to warn recreationists of ice shedding hazards, and on-site workers will be educated to properly ensure safety. Further, if an ice event were to occur, activities within close proximity to the turbines will be restricted until the ice has melted. The turbine is located greater than 650 m from Highway 14 and 1.1 km from the nearest building, mitigating the risk of ice harming nearby residents and drivers.

Mitigation measures described above are considered to be standard best practices, and are expected to address potential impacts. Therefore, human health is not assessed further.

5.5 Radar/Radio Interference

5.5.1 Electromagnetic Interference Study

Wind turbines are large enough to potentially interfere with radio waves emitted from telecommunication radar systems. In response to the potential for interference, the Radio Advisory Board of Canada (RABC) and CanWEA have issued a set of guidelines which describe the methodology and provide guidelines for assessing electromagnetic interference (EMI) caused by wind turbines. In these guidelines, areas surrounding communication transmission systems (consultation zones) have been specified based on system type and function.

EMI can be created by a wind turbine and classified in two categories:

1. Obstruction: Occurs when a wind turbine is placed between a receiver and a transmitter, creating an area where the signal is weakened and/or blocked.
2. Reflection: Caused by the distortion between a raw signal and a reflection of the signal from an object. Scatter is a sub-category of reflection, and is caused by the rotor blade movement.

The specific characteristics of a wind turbine will influence the type and magnitude of the interference. Other factors that influence interference include blade dimension and design, tower height, diameter of the supporting tower, as well as the material used for blade and tower construction. Furthermore, wind turbines affect different types of signals in various ways as some telecommunication signals are more robust to interference than others.

An Electromagnetic Interference (EMI) study was completed for an adjacent site and the following systems were identified and investigated:

- Point-to-Point Systems (microwave links, fixed-link systems)
- Over-the-Air Reception
- Cellular Type Networks
- Satellite Systems
- Land Mobile Networks
- Air Defence Radars, Vessel Traffic Radars and Air Traffic Control Radars
- Weather Radars

5.5.2 Electromagnetic Interference Effects and Mitigation

The following groups have been contacted as part of the EMI study:

- Department of National Defense
- Nav Canada
- RCMP
- Environment Canada

The results of the correspondences with the above mentioned groups reveal no major objections to the Project. Notably, the Department of National Defence (DND) has confirmed

that the Project does not interfere with their radar systems (Appendix D), NAV Canada has approved the Project (Appendix D), and Environment Canada has stated that they do not have major objections (Appendix D). The RCMP has been contacted and no response has been received to date (Appendix D).

The Project Team will consult with Transport Canada, Industry Canada, and the Coast Guard at a later date.

5.6 Transportation

5.6.1 Transportation Study

A detailed transportation study was completed to determine appropriate routes and means for equipment and materials to be delivered to the Project site. It is anticipated that as many resources and components as possible will be purchased from local suppliers and manufacturers.

A survey of proposed routes for transporting turbine components was conducted assuming tower manufacturing in Trenton, Nova Scotia and all other components arriving by rail or water to Halifax, Nova Scotia. A survey of routes from Trenton and Halifax to the Project site revealed few slight road modifications, mostly involving the removal of signage and guardrails on Route 14.
In addition, the following permits may need to be obtained:

- Work Within Highway Right of Way Permit - required if removing access signs and guard rails.
- Overweight Special Moves Permit from Service NS and Municipal Relations - to transport oversized and overweight components. In some cases, due to the size and weight of the components, some may only be transported on Sundays.
- Road weight restrictions, especially Spring Weight Restrictions, for heavier equipment and materials that will be transported to the site.
- Access points will be designed with proper height and width to accommodate large trucks and will adhere to commercial stopping sight distances. See Appendix E for construction drawings showing modifications that will need to be made to turning radii at the entrance of Kaizer Meadow Road from Highway 14 and the entrance to the Project site from Kaizer Meadow Road.

The following is the proposed route from the Logistec Stevedoring Port in Halifax to the Kaizer Meadow Wind Project site:

1. Drive straight out of Logistec entrance.
2. 0.8 km turn left onto Lower Water Street.
3. When merging onto Barrington Street, stay in the left lane.
4. Merge from Barrington to Bedford Highway (up until this point, this is the common route out of the port).
    a. Blades will continue on Bedford Highway and exit onto Highway 102. Based on the turning radius review, the blades will enter Highway 102 at Exit 1G or

from Hammonds Plains Road. In the event that neither one of these two exits have adequate turning radii, blades will continue on Hammonds Plains Road (Route 213), and merge onto Highway 103 at Tantallon.

b. Nacelles would be preferred to exit onto Highway 102 at 1G from the Bedford Highway; however, some structures may not be suitable. In this case, permission will be sought from the Province to exit at Kearney Lake from Bedford Highway, and utilize Dunbrack Street and Lacewood Drive to access Highway 102, from which point Highway 103 can be accessed at exit 1A *OR* Dunbrack Street can be utilized to access Highway 102 at exit 1H, then Highway 103 at exit 1A. Hubs will be transported via the Bedford Highway to Highway 102 at exit 1G.
c. All remaining components will be transported to Highway 103 via the Bedford Highway, Kearney Lake, and Highway 102.

5. From Highway 103, depending on the location of site entrances, trucks will take Exit 8 onto Route 14 or Exit 9 onto Route 12 and cut across Windsor Road to connect to Route 14. Of note, at each of these exits, it is likely that signage and guardrails will need to be removed.

The following is the proposed route from the Trenton Works Facility to the Project site:

1. Turn left out of Trenton Works onto Trenton Connector.
2. Go 0.6 km then turn left following Trenton Connector.
3. At km 2.7, there is a steel grating causeway which may pose a potential structural issue for weight; however, this route has been used in the past to transport heavier wind components and should not be a problem.
4. At km 9, turn left from Trenton Connector to Highway 106.
5. Merge from Highway 106 onto Highway 104 using sloping ramp.
6. Continue on Highway 104 to Exit 15 and enter onto Highway 102.
7. Base only will deviate from Highway 102 at Elmsdale Exit, to Highway 214, then will turn left into Highway 2, getting back onto Highway 102 at the Enfield Exit.
8. Take Exit 4C off of Highway 102 to avoid low structure. Turn right into Glendale Road, then left onto Cobequid Road, then at the end of Cobequid Road turn left onto Highway 101.
9. Highway 101 exit (1G) back onto Highway 102.
10. Continue on Highway 102 to Highway 103.
11. From Highway 103, depending on the location of site entrances, trucks will take Exit 8 onto Route 14 or Exit 9 onto Route 12 and cut across Windsor Road to connect to Route 14. Of note, at each of these exits, it is likely that signage and guardrails will need to be removed.

5.6.2 Transportation Effects and Mitigation

The survey of routes from Trenton and Halifax to the Project site revealed few slight road modifications, mostly involving the removal of signage and guardrails on Route 14. To mitigate any negative effects on motorists along Route 14 during the transportation of turbine components, a notice will be placed in public areas to inform local residents of signage removal or road infrastructure alterations. Removed signage and guardrails will be

immediately replaced and appropriate temporary signage will be provided as necessary to ensure travelling public safety. Major transportation effects are not expected as a result of the proposed transportation routes and component transportation activities.

To the extent possible, transportation through Halifax will avoid high traffic times (7-9 am and 3-6 pm; Monday to Friday). All travel will be conducted using safe work practices for transporting oversized loads.

Transport of equipment will be via a minimum number of vehicles to minimize impacts to road-way flow and impacts on air quality due to exhaust. As previously stated, to transport heavy and oversized turbine components, a Special Move Permit will be obtained from Service Nova Scotia and Municipal Relations, as specified under the Weights and Dimensions of Vehicles Regulation under Section 191 of the *Motor Vehicle Act.* Further, upgrades will be made to roads and overhead wires, branches, and signs if conflicts arise. For areas requiring modifications, these will be completed to their specifications and any areas requiring reinstatement will also be completed as requested.

During the Project's construction phase, trucks and other vehicles will be frequently visiting the Project site resulting in increased vehicular sound. To mitigate this effect, vehicles will only be visiting and working on-site during normal daytime hours of operation and will avoid high-traffic times of day to reduce local traffic congestion.

Mitigation measures described above are considered to be standard best practices and are expected to address potential impacts. Therefore, transportation is not assessed further.

5.7 Cultural and Heritage Resources

The Department of Communities, Culture, and Heritage conducted a review of heritage resources in the vicinity of both the Project site and the Kaizer Meadow Environmental Management Centre. No recorded archaeological sites were found and it was determined that potential for pre-contact First Nations archaeological sites was low. Furthermore, historical maps show no settlement related features, suggesting that the potential for historic period archaeological sites is low.

An additional review of a study of archaeological and heritage resources, completed in 2004 for the development of the Kaizer Meadow Landfill, also indicated that there was no record of archaeological sites within or adjacent to that project site (KML Consulting and Jacques Whitford 2004). The 2004 study also stated that the closest area considered to be high potential was Panuke Lake, located 7 km east of the landfill site, and that no archaeological or heritage resources were discovered during construction of the landfill.

Based on the desktop study and review of other information, the Department of Community, Culture and Heritage confirmed that an Archaeological Resources Impact Assessment was unnecessary (Appendix D). Culture and heritage resources are therefore not assessed further.

In the unlikely event that archaeological resources are discovered, work will be stopped and the Heritage Division of the Department of Communities, Culture, and Heritage will be contacted.

5.8 Mi'kmaq Ecological Knowledge Study

As a result of a review of the Draft Environmental Assessment for the Kaizer Meadow Wind Project, a Mi'kmaq Ecological Knowledge Study (MEKS) was deemed to be unnecessary by the Office of Aboriginal Affairs due to the small Project footprint and indications of low presence of archaeological and First Nations resources.

6.0 OTHER CONSIDERATIONS

6.1 Visual Impacts

6.1.1 Predicted View Plane

To assess the potential impact on visual aesthetics, representative photos were taken from accessible locations within a 3 km radius of the Project site to complete a Visual Impact Assessment (VIA).

Photographs were collected in June 2012 with magnetic bearings and a GPS waypoint recorded at each photo location. Geographical Information System (GIS) software was used to plot the photo locations and construct bearing lines to assist in the construction of a 3D view, generated using the GIS. A 3D surface was then constructed using the provincial Digital Elevation Model (DEM) points from the Nova Scotia Topographic Database (NSTDB), which supports 5 m contour intervals. The proposed turbine location and specifics regarding the height of the turbine were used to develop the view plane. Each selected viewing site was created using the viewer location (photo GPS point, elevation, and bearing line) resulting in an accurate 3D view. The resulting computer generated view was then merged with the digital photographs using a scaled image of the proposed turbine.

Photos taken from two locations near the Project site (Drawing 6.1) were used to create simulated images of the view plane, as shown Figures 6.1 and 6.2. Additional photos were taken from along Highway 14, Sherwood Road, and adjacent to the Kaizer Meadow Environmental Management Centre; however, due to extensive tree cover, the turbine is not visible in the photos.

N

Dam Bay

Highway 14

Photo 6.1

Photo 6.2

Card Lake

Anderson Lake

Kaizer Meadow Road

Landfill

Highway 14

Notes:

1. Reference: Digital topographic Mapping by Nova Scotia Geomatics Centre.
2. Projection: NAD83(CSRS), UTM Zone 20 North.

Legend:

- Proposed Turbine Location
- Viewpoint Location
- Direction of View
- Project Site Boundary
- Proposed Road
- Existing Paved Road
- Existing Trail / Access Road
- Mapped Stream
- Indefinite Stream
- Mapped Water Bodies
- Mapped Wet Area
- Cleared Area

Visual Assessment Locations

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Strum ENVIRONMENTAL

DATE:	PROJECT #:
June 2012	12-4360
SCALE: 1:15,000	DRAWING #: **6.1**
DRAWN BY: H. Serhan	
CHECKED BY: A. Walter	

Predicted View:

Actual View:

Figure 6.1: View looking southeast into the Project site.
Photo location: Highway 14.

Predicted View:

Actual View:

Figure 6.2: View looking east into the Project site.
Photo location: Near the junction of Highway 14 and Kaizer Meadow Road.

6.1.2 Effects and Mitigation

Aesthetic value is primarily a function of individual perceptions and preferences and as such, perceived impacts will vary greatly among community members and visitors to the area.

Given the size (i.e. one turbine) and location (i.e. 2.5 km from nearest building) of the Project, impacts to the visual landscape will not be further evaluated.

6.2 Sound Impacts

6.2.1 Sources of Sound

Sound from wind turbines comes from two general sources: the mechanical equipment, and the sound from the interaction of the air with the turbine parts, primarily the blades (NSE 2008). In modern turbine designs, much of the mechanical noise is mitigated through the use of noise insulating materials. Aerodynamic noise, however, is a product of the turning of turbine blades and is thus an unavoidable aspect of wind power operations. Turbines can emit noises of different frequencies, and an individual's perception of the noise can depend upon their hearing acuity and their tolerance for particular noise types (Committee on Environmental Impacts of Wind Energy Projects, National Research Council 2007). Furthermore, the propagation of sound from the turbine source to a receptor, such as a residential dwelling, is influenced not only by the sound power level emitted from the turbine, but also by local factors such as distance to the receptor, topography, and weather conditions (Hau 2006). For example, increases in wind speed result in increases in ambient, natural noise (from vegetation movement) that can mask the sounds emitted from the turbine(s) (as cited in Committee on Environmental Impacts of Wind Energy Projects, National Research Council 2007).

Apart from noise generated during the operation of the wind power projects, noise is also produced during the construction, operations and maintenance, and decommissioning phases. This noise is often associated with such activities as equipment operation, blasting, and the movement of traffic to and from the facility (Committee on Environmental Impacts of Wind Energy Projects, National Research Council 2007). Equipment expected to be used within the Project site will include: back hoes, bulldozers, flatbed trailers, cranes, dump trucks, ready mix trucks, and smaller maintenance vehicles.

6.2.2 Infrasound

Infrasound is very low-frequency sound, typically defined as being between 1-20 Hz, and is below what human ears can normally hear, though the 16-20 Hz range can be audible at very high volumes. Low frequency sound and infrasound are everywhere in the environment and are emitted from natural sources (e.g. wind, rivers) and from artificial sources including road traffic, aircraft, and ventilation systems. The most common source of infrasound is vehicles (CMHO 2010). Under many conditions, low frequency sound below 40 Hz from wind turbines cannot be distinguished from environmental background noise (CMHO 2010).

Concern about infrasound from wind turbines may have originated from the experience of neighbours of early wind turbine designs with downwind rotors (rotors downwind of the tower), which created objectionable levels of infrasound. In contrast, all modern utility scale

wind turbines have upwind rotors that produce significantly lower infrasound emissions (Bastasch et al. 2006).

There is no evidence of adverse health effects from infrasound below the sound pressure level of 90 dB. Studies conducted to assess wind turbine noise indicate that infrasound and low frequency sounds from modern wind turbines (typically at 50 dB to 70 dB) are well below the level where known health effects can occur(Leventhall 2006).

A scientific advisory panel with expertise in audiology, acoustics, otolaryngology, occupational/ environmental medicine, and public health was assembled in early 2009 to conduct a review of current literature available on the issue of perceived health effects of wind turbines (Colby et al. 2009). Following their review and analysis of the information, the panel reached consensus on the following conclusions:

- There is no evidence that the audible or sub-audible sounds emitted by wind turbines have any direct adverse physiological effects.
- The ground-borne vibrations from wind turbines are too weak to be detected by, or to affect, humans.
- The sounds emitted by wind turbines are not unique. There is no reason to believe, based on the levels and frequencies of the sounds and the panel's experience with sound exposures in occupational settings, that the sounds from wind turbines could plausibly have direct adverse health consequences.

The Chief Medical Officer of Health in Ontario also conducted a review of papers and reports (from 1970 to date) on wind turbines and health from scientific bibliographic databases, grey literature, and from a structured Internet search. The report concluded that "low frequency sound and infrasound from current generation upwind model turbines are well below the pressure sound levels at which known health effects occur. Further, there is no scientific evidence to date that vibration from low frequency wind turbine noise causes adverse health effects" (CMHO 2010).

6.2.3 Sound Assessment

A sound assessment was conducted for the Project to predict future sound levels (Appendix F). The model followed ISO 9613-2 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method and calculations, and was based on the following input information:

- UTM coordinates for the wind turbine location;
- 1/1 Octave bank sound power level data for the wind turbine;
- tonality and uncertainty analysis for the proposed wind turbine (5 dB tonality penalty applied to be conservative);
- UTM coordinates for receptors (all properties within a 2 km radius of the Project site, including vacant sites, were evaluated – 23 receptors in total); and
- topographic data for the surrounding area.

As there are no specific sound guidelines for wind farms in Nova Scotia, sound level limits from the Ontario Ministry of the Environment (MOE) publication, "*Noise Guidelines for Wind Farms*", (October 2008) were used. Predicted off-site sound levels were evaluated against the MOE guideline of 40 decibels (dBA). A wind speed of 8 m/s was used for the calculations because sound power levels emitted from the turbine are greatest at this speed (a worst-case scenario). Mapping illustrating the predicted sound levels relative to receptors is provided in Drawing 6.2.

The results of the assessment indicate that predicted sound levels do not exceed 40 dBA at any existing or vacant lot receptors (Table 6.1).

Table 6.1: Predicted Sound Levels at Noise Receptors

Receptor ID	Easting	Northing	Predicted Sound Level (dBA)
R1	402,151	4,953,018	29.6
R2	402,173	4,953,032	29.5
R3	401,783	4,952,787	31.6
R4	402,407	4,952,707	27.3
R5	401,736	4,952,949	32.6
R6	401,793	4,953,015	32.4
R7	402,158	4,953,005	29.6
R8	402,200	4,952,629	28.3
R9	399,789	4,952,522	31.7
R10	401,710	4,952,954	32.9
R11	402,257	4,952,653	28
RV1	400,709	4,952,473	34.5
RV2	401,442	4,952,166	29.9
RV3	401,072	4,954,207	36.3
RV4	401,612	4,955,077	27.5
RV5	399,014	4,952,375	26.8
RV6	399,745	4,953,407	35.3
RV7	399,046	4,953,852	28.8
RV8	399,421	4,953,959	31.3
RV9	399,954	4,954,772	30.2
RV10	402,461	4,954,152	27.2
RV11	400,420	4,951,534	27
RV12	400,713	4,955,413	27

6.2.4 Effects and Mitigation

Most of the potential effects with regards to noise generation from wind power developments are related to annoyance and unpleasantness on the part of residents in the vicinity of the development. The degree of this annoyance is a function of both the acoustic properties of the sound and of the attitude of the person hearing the sound. For instance, what one

individual may find to be a soothing sound, another may find unpleasant (Sathyajith 2006). Most authorities agree however, that there is currently no evidence to suggest that sound emitted from wind turbines has any direct health effects to those exposed to it (Colby et al. 2009; CMHO 2010).

Impacts related to sound are expected to be minimal for the following reasons:

- Predictive modelling indicates that all receptors comply with the MOE guideline of 40 dBA. The highest predicted sound level at a receptor (Kaizer Meadow Environmental Management Centre) with an existing on-site building is 32.6 dBA
- The closest residential dwelling is a minimum of 2.33 km from the turbine.
- The Project site is located adjacent to an actively operating solid waste management facility, which experiences regular truck traffic and therefore the increase in truck traffic for this Project is not expected to result in a significant increase from current sound levels.

Table 6.2 summarizes the potential effects related to sound arising from the Project. Mitigation measures are provided below.

Table 6.2: Potential Sound Effects

Potential Effect	Source of the Effect	Project Phase*		
		C	O/M	D
Increased sound levels	Site equipment (back hoes, bulldozers, flatbed trailers, cranes, dump trucks, ready mix trucks, and smaller maintenance vehicles)	✔	✔	✔
	Turbine operation		✔	

**C – Construction Phase O/M – Operations/Maintenance Phase D – Decommissioning Phase*

The following mitigative measures will be implemented to minimize or eliminate impacts to the acoustic environment:

- Incorporation of noise considerations into the design of Project infrastructure, as can be provided by the manufacturer of the selected turbine make and model.
- Site preparation and construction activities will be planned to occur between the hours of 0700 hrs and 1900 hrs.
- Development and implementation of an EPP for all phases of the Project that will include specific mitigative measures related to the acoustic environment such as provisions for any post-construction monitoring and noise complaint response protocol. The EPP will be approved by NSE prior to start of construction

Mitigation measures described above are considered to be standard best practices, and are expected to address potential impacts. Therefore, sound is not further assessed.

N

Dam Bay

Card Lake

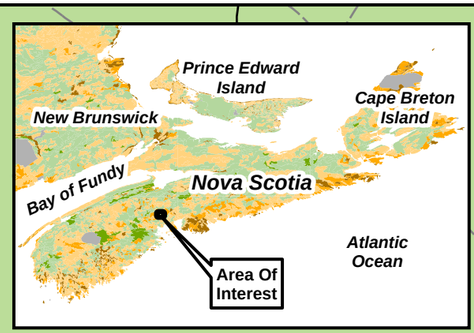
Anderson Lake

Highway 14

Kaizer Meadow Road

RV1 RV2 RV3 RV4 RV5 RV6 RV7 RV8 RV9 RV10 RV11 RV12

R1 R2 R3 R4 R5 R6 R7 R8 R10 R11



0 255 510 1,020 1,530 2,040 Metres

Notes:

1. Reference: Provincial 1:10,000 Topographic Mapping (Service NS). Noise Contours as Calculated in WindPro v. 2.8.
2. Projection: NAD83(CSRS), UTM Zone 20 North.

Legend:

- Proposed Turbine Location
- Proposed Road
- Project Site Boundary

Noise Receptors

- Existing Receptors
- Vacant Lot Receptors
- Major Roads and Highways
- Water Bodies

Predicted Noise Levels

dBA

- 35
- 40
- 45
- 50
- 55

Sound Assessment

MUNICIPALITY OF THE DISTRICT OF CHESTER

MINAS BASIN

Strum ENVIRONMENTAL

Date: June 2012	***Project #:*** 12-4360
Scale: 1:15,000	***Sheet:*** **6.2**
Drawn By: G. Gregory	
Checked By: A. Walter	

7.0 CONSULTATION AND ENGAGEMENT

As mandated by the EA process, consultation is an important and necessary part of developing energy projects. Consultation includes, but is not limited to, government groups, local residents, landowners, and special interest groups. Additionally, the Project team understands the requirement to engage First Nations and is adhering to the document "Proponents' Guide: Engagement with the Mi'kmaq of Nova Scotia".

Consultation and engagement allows Proponents to better understand local issues and concerns, mitigate against such issues, and share information about the Project and the environment with all potential stakeholders. Allowing the community to become involved and stay informed is valued by the Project team and as such, an open line of communication will be maintained throughout the duration of the Project.

It is important to note that the Project is part of the Community Feed-In Tariff (COMFIT) program and is wholly owned by the Municipality of the District of Chester. All Project benefits will therefore remain in the municipality and as such, community leadership has been engaged in the Project from inception.

A list of all concerns expressed about the potential adverse effects of the Project will be compiled and appropriately addressed.

7.1 Consultation Summary

To date, the Project team has delivered a presentation to the Municipality of the District of Chester's Council, shared information with the public via a newsletter, contacted First Nations groups, developed plans to meet with community groups including the Citizens Monitoring Committee (CMC) of the Kaizer Meadow Environmental Management Centre, and is planning an open-house event.

Table 7.1 provides dates of consultation that has been conducted, or that is planned, for the Project. Additional details on completed activities are provided below.

Table 7.1: Timeline of Completed and Planned Consultation

Date	Activity
Completed	
September 8, 2011	Meeting with Municipality of the District of Chester Council
September 13, 2011	Letter sent to Kwilmu'kw Maw-Klusuaqn Negotiation Office (KMKNO)
July 10, 2012	Letter sent to Office of Aboriginal Affairs (OAA)
July 23, 2012	Email sent to Glooscap First Nation
July 23, 2012	Email sent to Acadia First Nation
July 26, 2012	Project newsletter distribution
Planned	
August 2012	Presentation to the Chester Chamber of Commerce
August 2012	Presentation to Village of Chester Tourism and Development Association (VOCTADA)

Date	Activity
August 2012	Presentation to the Chester Village Commission
August 21, 2012	Open-House at Kaizer Meadow Landfill, 1-4pm
August 23, 2012	Special Council Meeting, formal presentation and public feedback, Chester Council Chambers, 9-11am
September 17, 2012	Presentation to the CMC of the Kaizer Meadow Environmental Management Centre

7.2 Completed Consultation

Minas Basin Pulp and Power (MBPP) presented the Project to the Council for the Municipality of the District of Chester in September 2011. Subsequent to the meeting, Council approved their participation in the COMFIT program and provided a letter to MBPP outlining their support for the Project (Appendix G).

Letters have been sent to the KMKNO and the OAA, to solicit feedback on the Project (Appendix G). To date, there has been no direct response to the Project team; however, the OAA was consulted by NSE during the Draft EA review, and feedback was received. Correspondence (e-mail) was also sent to Glooscap First Nation (approximately 50 km from the Project site) and Acadia First Nation's Gold River Reserve (approximately 30 km from the Project site) to provide an outline of the Project and a copy of the Project newsletter. To date, no responses have been received. Nonetheless, continued efforts will be made to solicit feedback from local First Nations to identify any concerns.

A newsletter was produced and distributed to various public locations, First Nations groups, local businesses, community groups, and the Village of Chester office (Appendix G). The newsletter contained information and visuals of the Project as well as contact information for the Project team. Additional future newsletters will be distributed at various phases of Project development.

The CMC for the Kaizer Meadow Environmental Management Centre will be utilized to share information and hear concerns/comments regarding the Project. To date, the CMC has discussed the Project and the Project team has committed to meeting with the CMC over the duration of the Project.

7.3 Planned Consultation

As previously stated, ongoing consultation and engagement for the Project will include newsletter updates, meetings with the CMC and other various community groups including the Chester's Municipal Council, and an open-house event. Notes and minutes from meetings and open-house sessions will be sent directly to NSE during the EA registration period.

8.0 EFFECTS ASSESSMENT

8.1 Identification of Valued Environmental Components

Based on the discussion and findings in Sections 4 and 5, avifauna and bats have been identified as a VEC for the Project.

To ensure all relevant issues and concerns related to the proposed Project are identified, an interaction matrix was used to evaluate the potential interactions between the Project phases and avifauna and bats (Table 8.1).

Table 8.1: Interaction Matrix

Project Phases / Activities	Avifauna/Bats
Site Preparation / Construction	
Surveying and Siting / Land Clearing	X
Road Construction / Upgrades	X
Equipment Delivery	X
Foundation Construction	X
Tower and Turbine Assembly	X
Temporary Storage	
Operation and Maintenance	
Scheduled turbine maintenance	X
Access road maintenance i.e. re-grading and snow removal	
Decommissioning	
Turbine and Associated Equipment Removal	X
Site Re-instatement	X
Accidents / Malfunctions	X

8.2 Environmental Effects Analysis Methodology

The completion of the environmental effects analysis involves consideration of the following elements:

- Description of potential negative environmental effects;
- Mitigation measures;
- Residual effects;
- Significance of residual environmental effects; and
- Monitoring or follow-up programs.

This EA is structured to include proposed mitigation to reduce or eliminate potential adverse environmental effects. The determination of significance of adverse environmental effects is based on post-mitigation (residual) effects, rather than unmitigated potential effects. The significance of residual effects of the Project will be determined using the following criteria, based on federal and provincial EA guidance, and as described in Table 8.2:

- Value of the resource affected;
- Magnitude of the effect;

- Geographic extent of the effect;
- Duration and frequency of the effect;
- Reversibility of the effect; and
- Ecological and/or social context.

The expectation for, and significance of, residual effects determines the need for a monitoring and/or follow-up program.

Table 8.2: Identification and Definition of Environmental Impacts

Attribute	Options	Definition
Scope (Geographic Extent)	Local	Effect restricted to area within 1 km of the Project site
	Regional	Effect extends up to several km from the Project site
	Provincial	Effect extends throughout Nova Scotia
Duration	Short-term	Effects last for less than 1 year
	Medium-term	Effects last for 1 to 10 years
	Long-term	Effects last for greater than 10 years
Frequency	Once	Occurs only once
	Intermittent	Occurs occasionally at irregular intervals
	Continuous	Occurs on a regular basis and regular intervals
Magnitude	Negligible	No measurable change from background in the population or resource; or in the case of air, soil, or water quality, if the parameter remains less than the standard, guideline, or objective
	Low	Effect causes <1% change in the population or resource (where possible the population or resource base is defined in quantitative terms)
	Moderate	Effect causes 1 to 10% change in the population or resource
	High	Effect causes >10% change in population in resource

The potential level of impact (i.e. adverse environmental effect) after mitigation measures (i.e. residual effects) was identified based on the criteria and definitions provided in the Natural Resources Canada document, “Environmental Impact Statement Guidelines for Screenings of Inland Wind Farms Under the Canadian Environmental Assessment Act” (NRCan, 2003), as shown in Table 8.3.

Table 8.3: Definition of Significant Residual Environmental Impact

Significance Level	Definition
High	Potential effect could threaten sustainability of the resource and should be considered a management concern. Research, monitoring, and/or recovery initiatives should be considered.
Medium	Potential effect could result in a decline in resource to lower-than-baseline but stable levels in the study area after project closure and into the foreseeable future. Regional management actions such as research, monitoring, and/or recovery initiatives may be required.

Significance Level	Definition
Low	Potential effect may result in slight decline in resource in study area during life of the project. Research, monitoring, and/or recovery initiatives would not normally be required.
Minimal/None	Potential effect may result in slight decline in resource in study area during construction phase, but should return to baseline levels.

8.3 Effects Assessment

Potential effects of the Project on the identified VEC are further analyzed in Tables 8.4-8.6 to identify and evaluate the significance of residual effects, based on the criteria listed in Tables 8.2 and 8.3. Mitigation measures are also summarized. Accidents and malfunctions are considered for each phase.

Table 8.4: Environmental Effects Analysis – Construction Phase

VEC	Potential Effect	Mitigation Summary	Significance Criteria	Residual Effects	Significance of Residual Effect
Avifauna/Bats	• Removal or disruption of habitat. • Sensory disturbance. • Mortality. • Increased chance of collision due to construction lighting.	• Development and implementation of an EPP. • Avoidance of any identified important habitat areas to the extent possible (wetlands, mature trees). • Minimize vegetation clearing. • Completion of vegetation clearing outside of nesting/breeding season, to the extent possible. • Limitation of site activities to designated workspaces. • Reduction or avoidance of construction lighting.	Scope: Local Duration: Short-term Frequency: Once Magnitude: Low	No residual effect anticipated.	**N/A**
Accidents and Malfunctions	• Accidental release. • Failure of erosion and sediment /control measures.	• Development and implementation of an EPP, including a spill prevention plan. • Development and implementation (as necessary) of emergency contingency plans.	Scope: Local Duration: Short-term Frequency: Once Magnitude: Negligible - Low	No residual effect anticipated.	**N/A**

Table 8.5: Environmental Effects Analysis – Operation/Maintenance Phase

VEC	Potential Effect	Mitigation Summary	Significance Criteria	Residual Effects	Significance of Residual Effect
Avifauna/Bats	• Mortality. • Sensory disturbance. • Lighting (turbines and associated infrastructure).	• Development and implementation of an EPP. • To the extent possible, planning of operation and maintenance activities to avoid sensitive habitats and to minimize time on-site. • Avoidance of routine vegetation clearing during nesting/breeding season. • Minimization of lighting on turbines and infrastructure and, where possible, use of strobe lights as approved by both Transport Canada and CWS.	Scope: Local Duration: Long-term Frequency: Continuous Magnitude: Low	It is expected that birds and bats will avoid the immediate area of the turbine (but not the broader Project site), which will reduce the number of collisions. Fatalities due to turbine collisions are not expected to be significant.	**Low**
Accidents and Malfunctions	• Accidental release. • Failure of turbine and/or associated equipment.	• Development and implementation of an EPP, including a spill prevention plan. • Development and implementation (as necessary) of emergency contingency plans that include regular contact with area first responders.	Scope: Local Duration: Short-term Frequency: Once Magnitude: Negligible-Low	No residual effect anticipated	**N/A**

Table 8.6: Environmental Effects Analysis – Decommissioning Phase

Environmental Component	Potential Effect	Mitigation Summary	Significance Criteria	Residual Effects	Significance of Residual Effect
Avifauna/Bats	• Removal or disruption of habitat. • Sensory disturbance. • Mortality.	• Limiting access to existing roads only. • Limiting time on site. • Avoidance of activities during breeding/nesting season, to the extent possible. • Restoration of habitat to the extent possible.	Scope: Local Duration: Short-term Frequency: Intermittent Magnitude: Negligible	No residual effect anticipated	**N/A**
Accidents and Malfunctions	• Accidental release. • Failure of erosion and sediment control measures	• Development and implementation of an EPP, including a spill prevention plan. • Development and implementation (as necessary) of emergency contingency plans.	Scope: Local Duration: Short-term Frequency: Once Magnitude: Negligible - Low	No residual effect anticipated	**N/A**

9.0 EFFECTS OF THE ENVIRONMENT ON THE UNDERTAKING

Environmental factors that have the potential to have damaging effects on wind turbines include:

- Extreme wind (typically associated with hurricanes);
- Hail;
- Ice storms/ ice formation;
- Heavy snow;
- Lightning; and
- Fire.

The primary mitigative measure employed during the construction and operation of the Project will be educating and training site personnel. Environmental and safety orientations will be conducted prior to the start of construction and all staff will be informed of the potential effects of the environment on the Project. Staff responsible for the operation and maintenance of the wind farm will be trained on the design and operation of the turbine, including applicable operating procedures, safety protocols, and evacuation plans.

Modern wind turbines are equipped with a number of mechanisms to reduce damage caused by extreme weather and are designed to shut down when certain thresholds are detected (CanWEA 2011). Furthermore, best practices and industry standards will be applied to the operation of the Project to manage risks of damage from extreme events. Table 9.1 demonstrates potential effects resulting from environmental events and the mitigation associated with each.

Table 9.1: Effects of Environmental Events and Associated Mitigation

Environmental Event	Effect	Mitigation
Hurricane/extreme winds	Damage to blades.	Turbine design equipped to shut down.
Hail	Damage to blades.	Turbine maintenance according to best practices and industry standards.
Ice storms	Ice formation. Potential ice throw.	• Turbine design equipped to shut down; • Appropriate safety protocol for wind farm site; • Restrict use of wind farm site; and • Signage to indicate potential falling ice.
Heavy snow	Damage to turbines.	Turbine design equipped to shut down.
Lightning strike	Potential fire during operation. Damage to electrical systems.	• Turbine design equipped with built-in grounding system; and • Appropriate safety protocol for wind farm site.
Fire	Fire during construction due to materials and machinery.	• Appropriate safety protocol for wind farm site; • Fire prevention plan; • Evacuation plan; and • Local training of first responders.

10.0 CUMULATIVE EFFECTS ASSESSMENT

Concerns are often raised about the long-term changes that may occur not only as a result of a single action but of the combined effects of each successive action on the environment (Hegman et al. 1999).

The cumulative effects assessment focuses only on adverse effects of the Project remaining after the application of mitigation measures (i.e. only residual effects). For this Project, the only VEC identified to have a potential residual effect is avifauna and bats. Therefore, known or anticipated activities within a 20 km radius of the Project site were reviewed to identify the potential for cumulative effects on avifauna and bats.

10.1 Activities near the Project

The Project is located within a rural setting in Nova Scotia with limited commercial/industrial development in close proximity to the Project site. The nearest towns are Chester (20 km) and Windsor (30 km). The Kaizer Meadow Environmental Management Centre is located approximately 1.3 km southeast of the turbine location. Nearby commercial development consists of forestry operations, a general store, a gas station, a small scale quarry, and a golf course. Additionally, a 30-50 turbine, 100 MW wind project has been proposed for the area. The South Canoe Wind Project is located approximately 3.5 km from the Project site. The closest turbine associated with this proposed wind farm is 4.6 km from the Kaizer Meadow turbine.

Activities that could potentially interact cumulatively with the Project are evaluated in Table 10.1.

Table 10.1: Potential Interactions with the Project

Activity	Status of Activity	Location of Activity	Potential Cumulative Effect on Avifauna/Bats
South Canoe Wind Farm	Future	Tract of land encompassing approximately 2,790 ha approximately 3.5 km from nearest Project site boundary.	Avifauna/bat fatality and habitat fragmentation.
Forestry/tree harvesting	Historical and ongoing	Approximately 170 m north of the Project footprint.	Habitat fragmentation.
Quarry	Historical and ongoing	Small scale quarry approximately 2 km southwest of the Project footprint.	Habitat fragmentation.

10.2 Significance of Cumulative Effects

Avifauna and bat fatality has been identified as a residual effect of the Project. Evidence cited by Erickson et al. (2001), NAS (2007) and Manville (2009) in NWCC (2010), state that although only general estimates are available, the number of birds killed in wind developments is substantially lower, relative to estimated annual bird casualty rates from a variety of other anthropogenic factors including vehicles, buildings and windows, power transmission lines,

communication towers, toxic chemicals (including pesticides), and feral and domestic cats (NWCC 2010). Therefore the incremental contribution of the Project to avifauna and bat mortality is unlikely to result in a population based cumulative effect.

The proposed turbine will be located approximately 3.5 km southeast of the proposed South Canoe Wind Project site boundary, 170 m from active forestry operations, and 2 km for active quarry operations. Since the turbine is planned to be sited in a previously disturbed area of land (cleared) and will make use of an existing road, it is not expected that the Project will contribute to cumulative effects on habitat fragmentation in the region.

Based on the discussion above, cumulative effects to avifauna and bats, is considered not significant.

11.0 FOLLOW UP MEASURES

11.1 Environmental Protection Plan

An EPP will be developed and approved by NSE prior to start of construction of the Project. The EPP will detail best practices and mitigative measures to be employed during construction to minimize environmental impacts noted in this report.

12.0 OTHER APPROVALS

In addition to the EA Approval, several other permits and/or approvals may be required prior to the start of construction (Table 12.1).

Table 12.1: List of Permits/Approvals Potentially Required

Approval/Notification/Permit Required	Government Agency
Environmental Protection Plan	NSE
Notification of Blasting (if required)	NSE
Special Move Permit	Service Nova Scotia
Access Permit	Nova Scotia Transportation and Infrastructure Renewal
Work within Highway Right-of-Way	Nova Scotia Transportation and Infrastructural Renewal
Final design location and height of turbine	NAV Canada and DND
Lighting design for navigational purposes	Transport Canada
Methodology for post-construction monitoring and related approvals (i.e. scientific permit)	CWS

13.0 CONCLUSIONS

In accordance with "A Proponent's Guide to Wind Power Projects: Guide for preparing an Environmental Assessment" (NSE 2012), the studies, regulatory assessments, and VEC evaluations described within this document have been considered both singularly and cumulatively. The results indicate that there are no significant environmental concerns or impacts that may result from the Project that cannot be effectively mitigated or monitored.

Best practices and standard mitigation methods will be implemented during all phases of the Project, as described in Section 4 and 5 to ensure methods and practices are comprehensive and are adhered to. Furthermore, an EPP will be developed, approved by NSE, and communicated to all employees working on the Project.

The proposed 2 MW turbine location has been optimized to utilize an existing access road into the Project site, and will be situated on an area of previously disturbed land (cutover). No sensitive habitats will be impacted by the proposed development.

Nova Scotia is championing renewable energy both in Canada and in the world with a target of 25% of net sales in the province being generated by low impact renewables by 2015 and the only jurisdiction in North America with absolute caps on greenhouse gas (GHG) emissions from the electricity sector (Renewable Electricity Plan, Nova Scotia Energy, April 2010). The Kaizer Meadow Wind Project will contribute to meeting the provincial renewable energy target, enhance energy security, reduce provincial GHG emissions, and is a project which Nova Scotians can be proud of.

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APPENDIX A
PLANT ASSESSMENT

Common Name	Scientific Name	NSDNR Status	COSEWIC Status	SARA Status	NSESA Status
Vascular Plants					
Acadian Quillwort	*Isoetes acadiensis*	Yellow	Not Listed	Not Listed	Not Listed
Alder-leaved Buckthorn	*Rhamnus alnifolia*	Yellow	Not Listed	Not Listed	Not Listed
Alpine Bilberry	*Vaccinium uliginosum*	Yellow	Not Listed	Not Listed	Not Listed
American Cancer-root	*Conopholis americana*	Red	Not Listed	Not Listed	Not Listed
American False Pennyroyal	*Hedeoma pulegioides*	Yellow	Not Listed	Not Listed	Not Listed
Bearded Sedge	*Carex comosa*	Yellow	Not Listed	Not Listed	Not Listed
Bebb's Sedge	*Carex bebbii*	Red	Not Listed	Not Listed	Not Listed
Big-leaved Marsh-elder	*Iva frutescens*	Yellow	Not Listed	Not Listed	Not Listed
Black Ash	*Fraxinus nigra*	Yellow	Not Listed	Not Listed	Not Listed
Blood Milkwort	*Polygala sanguinea*	Yellow	Not Listed	Not Listed	Not Listed
Blue Cohosh	*Caulophyllum thalictroides*	Red	Not Listed	Not Listed	Not Listed
Blunt Sweet Cicely	*Osmorhiza depauperata*	Red	Not Listed	Not Listed	Not Listed
Blunt-leaved Bedstraw	*Galium obtusum*	Red	Not Listed	Not Listed	Not Listed
Bog Willow	*Salix pedicellaris*	Yellow	Not Listed	Not Listed	Not Listed
Boreal Aster	*Symphyotrichum boreale*	Yellow	Not Listed	Not Listed	Not Listed
Bristle-leaved Sedge	*Carex eburnea*	Yellow	Not Listed	Not Listed	Not Listed
Buttonbush Dodder	*Cuscuta cephalanthi*	Red	Not Listed	Not Listed	Not Listed
Canada Anemone	*Anemone canadensis*	Red	Not Listed	Not Listed	Not Listed
Canada Germander	*Teucrium canadense*	Yellow	Not Listed	Not Listed	Not Listed
Canada Lily	*Lilium canadense*	Yellow	Not Listed	Not Listed	Not Listed
Canada Rice Grass	*Piptatherum canadense*	Yellow	Not Listed	Not Listed	Not Listed
Canada Tick-trefoil	*Desmodium canadense*	Red	Not Listed	Not Listed	Not Listed
Canada Wood Nettle	*Laportea canadensis*	Yellow	Not Listed	Not Listed	Not Listed
Case's Ladies'-Tresses	*Spiranthes casei*	Yellow	Not Listed	Not Listed	Not Listed
Chaffweed	*Anagallis minima*	Red	Not Listed	Not Listed	Not Listed
Chestnut Sedge	*Carex castanea*	Red	Not Listed	Not Listed	Not Listed
Chinese Hemlock-parsley	*Conioselinum chinense*	Yellow	Not Listed	Not Listed	Not Listed
Climbing False Buckwheat	*Fallopia scandens*	Yellow	Not Listed	Not Listed	Not Listed
Clustered Sanicle	*Sanicula odorata*	Red	Not Listed	Not Listed	Not Listed
Coastal Plain Blue-eyed-grass	*Sisyrinchium fuscatum*	Red	Not Listed	Not Listed	Not Listed
Coastal Plain Joe-pye-weed	*Eutrochium dubium*	Red	Not Listed	Not Listed	Not Listed
Comb-leaved Mermaidweed	*Proserpinaca pectinata*	Yellow	Not Listed	Not Listed	Not Listed
Common Buttonbush	*Cephalanthus occidentalis*	Yellow	Not Listed	Not Listed	Not Listed
Common Moonwort	*Botrychium lunaria*	Red	Not Listed	Not Listed	Not Listed
Cuckoo Flower	*Cardamine pratensis*	Red	Not Listed	Not Listed	Not Listed
Cursed Buttercup	*Ranunculus sceleratus*	Red	Not Listed	Not Listed	Not Listed
Cut-Leaved Coneflower	*Rudbeckia laciniata*	Yellow	Not Listed	Not Listed	Not Listed
Disguised St John's-wort	*Hypericum dissimulatum*	Yellow	Not Listed	Not Listed	Not Listed
Downy Rattlesnake-Plantain	*Goodyera pubescens*	Red	Not Listed	Not Listed	Not Listed
Downy Willowherb	*Epilobium strictum*	Yellow	Not Listed	Not Listed	Not Listed
Drummond's Rockcress	*Arabis drummondii*	Yellow	Not Listed	Not Listed	Not Listed
Dudley's Rush	*Juncus dudleyi*	Yellow	Not Listed	Not Listed	Not Listed
Dwarf Bilberry	*Vaccinium caespitosum*	Yellow	Not Listed	Not Listed	Not Listed
Dwarf Clearweed	*Pilea pumila*	Red	Not Listed	Not Listed	Not Listed
Eastern Leatherwood	*Dirca palustris*	Red	Not Listed	Not Listed	Not Listed
Eastern Lilaeopsis	*Lilaeopsis chinensis*	Yellow	Special Concern	Special Concern	Vulnerable
Eastern White Cedar	*Thuja occidentalis*	Red	Not Listed	Not Listed	Vulnerable
False Mermaidweed	*Floerkea proserpinacoides*	Yellow	Not at Risk	Not Listed	Not Listed
Farwell's Water Milfoil	*Myriophyllum farwellii*	Yellow	Not Listed	Not Listed	Not Listed
Field Locoweed	*Oxytropis campestris*	Red	Not Listed	Not Listed	Not Listed
Flat-stemmed Pondweed	*Potamogeton zosteriformis*	Yellow	Not Listed	Not Listed	Not Listed
Fleshy Stitchwort	*Stellaria crassifolia*	Red	Not Listed	Not Listed	Not Listed
Fragrant Wood Fern	*Dryopteris fragrans*	Yellow	Not Listed	Not Listed	Not Listed
Fries' Pondweed	*Potamogeton friesii*	Red	Not Listed	Not Listed	Not Listed
Fringed Blue Aster	*Symphyotrichum ciliolatum*	Yellow	Not Listed	Not Listed	Not Listed
Glaucous Blue Grass	*Poa glauca*	Yellow	Not Listed	Not Listed	Not Listed
Golden Alexanders	*Zizia aurea*	Red	Not Listed	Not Listed	Not Listed
Golden Crest	*Lophiola aurea*	Red	Special Concern	Threatened	Threatened
Grass-leaved Rush	*Juncus marginatus*	Yellow	Not Listed	Not Listed	Not Listed
Green Spleenwort	*Asplenium viride*	Yellow	Not Listed	Not Listed	Not Listed
Greene's Rush	*Juncus greenei*	Red	Not Listed	Not Listed	Not Listed
Greenland Stitchwort	*Minuartia groenlandica*	Yellow	Not Listed	Not Listed	Not Listed
Hairlike Sedge	*Carex capillaris*	Yellow	Not Listed	Not Listed	Not Listed
Hairy Goldenrod	*Solidago hispida*	Red	Not Listed	Not Listed	Not Listed
Hairy Lettuce	*Lactuca hirsuta*	Yellow	Not Listed	Not Listed	Not Listed
Halberd-leaved Tearthumb	*Persicaria arifolia*	Yellow	Not Listed	Not Listed	Not Listed

Common Name	Scientific Name	NSDNR Status	COSEWIC Status	SARA Status	NSESA Status
Vascular Plants					
Hayden's Sedge	*Carex haydenii*	Red	Not Listed	Not Listed	Not Listed
Heart-leaved Foamflower	*Tiarella cordifolia*	Yellow	Not Listed	Not Listed	Not Listed
Horn-leaved Riverweed	*Podostemum ceratophyllum*	Red	Not Listed	Not Listed	Not Listed
Houghton's Sedge	*Carex houghtoniana*	Yellow	Not Listed	Not Listed	Not Listed
Hyssop-leaved Fleabane	*Erigeron hyssopifolius*	Yellow	Not Listed	Not Listed	Not Listed
Intermediate Mermaidweed	*Proserpinaca intermedia*	Red	Not Listed	Not Listed	Not Listed
Inverted Bladderwort	*Utricularia resupinata*	Red	Not Listed	Not Listed	Not Listed
Large Round-Leaved Orchid	*Platanthera macrophylla*	Yellow	Not Listed	Not Listed	Not Listed
Large St John's-wort	*Hypericum majus*	Red	Not Listed	Not Listed	Not Listed
Large Tick-Trefoil	*Desmodium glutinosum*	Red	Not Listed	Not Listed	Not Listed
Large Toothwort	*Cardamine maxima*	Red	Not Listed	Not Listed	Not Listed
Least Moonwort	*Botrychium simplex*	Yellow	Not Listed	Not Listed	Not Listed
Lesser Brown Sedge	*Carex adusta*	Yellow	Not Listed	Not Listed	Not Listed
Lesser Pyrola	*Pyrola minor*	Yellow	Not Listed	Not Listed	Not Listed
Lesser Rattlesnake-plantain	*Goodyera repens*	Yellow	Not Listed	Not Listed	Not Listed
Livid Sedge	*Carex livida*	Red	Not Listed	Not Listed	Not Listed
Long-bracted Frog Orchid	*Coeloglossum viride*	Red	Not Listed	Not Listed	Not Listed
Long-leaved Starwort	*Stellaria longifolia*	Yellow	Not Listed	Not Listed	Not Listed
Long's Bulrush	*Scirpus longii*	Yellow	Special Concern	Special Concern	Vulnerable
Long's Sedge	*Carex longii*	Red	Not Listed	Not Listed	Not Listed
Loose-Flowered Sedge	*Carex laxiflora*	Red	Not Listed	Not Listed	Not Listed
Maidenhair Spleenwort	*Asplenium trichomanes*	Yellow	Not Listed	Not Listed	Not Listed
Marsh Bellflower	*Campanula aparinoides*	Yellow	Not Listed	Not Listed	Not Listed
Marsh Horsetail	*Equisetum palustre*	Red	Not Listed	Not Listed	Not Listed
Meadow Horsetail	*Equisetum pratense*	Yellow	Not Listed	Not Listed	Not Listed
Nantucket Serviceberry	*Amelanchier nantucketensis*	Red	Not Listed	Not Listed	Not Listed
Narrow-leaved Panic Grass	*Dichanthelium linearifolium*	Yellow	Not Listed	Not Listed	Not Listed
Necklace Spike Sedge	*Carex ormostachya*	Red	Not Listed	Not Listed	Not Listed
Netted Chain Fern	*Woodwardia areolata*	Yellow	Not Listed	Not Listed	Not Listed
Newfoundland Dwarf Birch	*Betula michauxii*	Yellow	Not Listed	Not Listed	Not Listed
Nodding Fescue	*Festuca subverticillata*	Red	Not Listed	Not Listed	Not Listed
Northern Adder's-tongue	*Ophioglossum pusillum*	Yellow	Not Listed	Not Listed	Not Listed
Northern Bedstraw	*Galium boreale*	Red	Not Listed	Not Listed	Not Listed
Northern Blueberry	*Vaccinium boreale*	Red	Not Listed	Not Listed	Not Listed
Northern Bog Violet	*Viola nephrophylla*	Yellow	Not Listed	Not Listed	Not Listed
Northern Comandra	*Geocaulon lividum*	Yellow	Not Listed	Not Listed	Not Listed
Northern Maidenhair Fern	*Adiantum pedatum*	Red	Not Listed	Not Listed	Not Listed
One-sided Rush	*Juncus secundus*	Red	Not Listed	Not Listed	Not Listed
Orange-fruited Tinker's Weed	*Triosteum aurantiacum*	Yellow	Not Listed	Not Listed	Not Listed
Ovate Spikerush	*Eleocharis ovata*	Yellow	Not Listed	Not Listed	Not Listed
Pale Jewelweed	*Impatiens pallida*	Yellow	Not Listed	Not Listed	Not Listed
Pale-Spiked Lobelia	*Lobelia spicata*	Red	Not Listed	Not Listed	Not Listed
Parlin's Pussytoes	*Antennaria parlinii*	Red	Not Listed	Not Listed	Not Listed
Peck's Sedge	*Carex peckii*	Red	Not Listed	Not Listed	Not Listed
Philadelphia Fleabane	*Erigeron philadelphicus*	Yellow	Not Listed	Not Listed	Not Listed
Pinebarren Golden Heather	*Hudsonia ericoides*	Yellow	Not Listed	Not Listed	Not Listed
Pink Crowberry	*Empetrum eamesii*	Yellow	Not Listed	Not Listed	Not Listed
Poison Sumac	*Toxicodendron vernix*	Red	Not Listed	Not Listed	Not Listed
Porcupine Sedge	*Carex hystericina*	Red	Not Listed	Not Listed	Not Listed
Prairie Sedge	*Carex prairea*	Red	Not Listed	Not Listed	Not Listed
Prickly Hornwort	*Ceratophyllum echinatum*	Red	Not Listed	Not Listed	Not Listed
Prototype Quillwort	*Isoetes prototypus*	Yellow	Special Concern	Special Concern	Vulnerable
Pubescent Sedge	*Carex hirtifolia*	Yellow	Not Listed	Not Listed	Not Listed
Purple-veined Willowherb	*Epilobium coloratum*	Yellow	Not Listed	Not Listed	Not Listed
Ram's-Head Lady's-Slipper	*Cypripedium arietinum*	Red	Not Listed	Not Listed	Endangered
Red Ash	*Fraxinus pennsylvanica*	Red	Not Listed	Not Listed	Not Listed
Redroot	*Lachnanthes caroliana*	Red	Special Concern	Threatened	Threatened
Redtop Panic Grass	*Panicum rigidulum*	Yellow	Not Listed	Not Listed	Not Listed
Richardson's Pondweed	*Potamogeton richardsonii*	Red	Not Listed	Not Listed	Not Listed
Robbins' Milkvetch	*Astragalus robbinsii*	Red	Not Listed	Not Listed	Not Listed
Rock Spikemoss	*Selaginella rupestris*	Red	Not Listed	Not Listed	Not Listed
Rock Whitlow-Grass	*Draba glabella*	Red	Not Listed	Not Listed	Not Listed
Rockrose	*Helianthemum canadense*	Red	Not Listed	Not Listed	Endangered
Roland's Sea-Blite	*Suaeda rolandii*	Red	Not Listed	Not Listed	Not Listed
Rosy Pussytoes	*Antennaria rosea*	Red	Not Listed	Not Listed	Not Listed
Round-lobed Hepatica	*Anemone americana*	Red	Not Listed	Not Listed	Not Listed

Common Name	Scientific Name	NSDNR Status	COSEWIC Status	SARA Status	NSESA Status
Vascular Plants					
Saltmarsh Starwort	*Stellaria humifusa*	Yellow	Not Listed	Not Listed	Not Listed
Scabrous Black Sedge	*Carex atratiformis*	Yellow	Not Listed	Not Listed	Not Listed
Seabeach Ragwort	*Senecio pseudoarnica*	Yellow	Not Listed	Not Listed	Not Listed
Seaside Brookweed	*Samolus valerandi*	Yellow	Not Listed	Not Listed	Not Listed
Sharp-fruited Rush	*Juncus acuminatus*	Yellow	Not Listed	Not Listed	Not Listed
Shining Ladies'-Tresses	*Spiranthes lucida*	Red	Not Listed	Not Listed	Not Listed
Short-awned Foxtail	*Alopecurus aequalis*	Yellow	Not Listed	Not Listed	Not Listed
Showy Lady's-Slipper	*Cypripedium reginae*	Red	Not Listed	Not Listed	Not Listed
Silky Willow	*Salix sericea*	Red	Not Listed	Not Listed	Not Listed
Sleepy Catchfly	*Silene antirrhina*	Red	Not Listed	Not Listed	Not Listed
Slender Blue Flag	*Iris prismatica*	Red	Not Listed	Not Listed	Not Listed
Slender Cottongrass	*Eriophorum gracile*	Yellow	Not Listed	Not Listed	Not Listed
Slender Panic Grass	*Dichanthelium xanthophysum*	Red	Not Listed	Not Listed	Not Listed
Slender Rice Grass	*Piptatherum pungens*	Yellow	Not Listed	Not Listed	Not Listed
Slender Wood Sedge	*Carex digitalis*	Red	Not Listed	Not Listed	Not Listed
Slim-stemmed Reed Grass	*Calamagrostis stricta*	Yellow	Not Listed	Not Listed	Not Listed
Small-flowered Bittercress	*Cardamine parviflora*	Yellow	Not Listed	Not Listed	Not Listed
Small-spike False-nettle	*Boehmeria cylindrica*	Red	Not Listed	Not Listed	Not Listed
Smooth Alder	*Alnus serrulata*	Yellow	Not Listed	Not Listed	Not Listed
Smooth Cliff Fern	*Woodsia glabella*	Yellow	Not Listed	Not Listed	Not Listed
Smooth Sweet Cicely	*Osmorhiza longistylis*	Red	Not Listed	Not Listed	Not Listed
Soapberry	*Shepherdia canadensis*	Yellow	Not Listed	Not Listed	Not Listed
Southern Mudwort	*Limosella australis*	Yellow	Not Listed	Not Listed	Not Listed
Southern Twayblade	*Listera australis*	Red	Not Listed	Not Listed	Not Listed
Spotted Pondweed	*Potamogeton pulcher*	Red	Not Listed	Not Listed	Not Listed
Spreading Wild Rye	*Elymus hystrix*	Red	Not Listed	Not Listed	Not Listed
Steller's Rockbrake	*Cryptogramma stelleri*	Red	Not Listed	Not Listed	Not Listed
Swamp Loosestrife	*Decodon verticillatus*	Yellow	Not Listed	Not Listed	Not Listed
Swan's Sedge	*Carex swanii*	Yellow	Not Listed	Not Listed	Not Listed
Sweet Pepperbush	*Clethra alnifolia*	Yellow	Special Concern	Special Concern	Vulnerable
Tall Beakrush	*Rhynchospora macrostachya*	Red	Not Listed	Not Listed	Not Listed
Tender Sedge	*Carex tenera*	Yellow	Not Listed	Not Listed	Not Listed
Thread-Like Naiad	*Najas gracillima*	Red	Not Listed	Not Listed	Not Listed
Torrey's Bulrush	*Schoenoplectus torreyi*	Red	Not Listed	Not Listed	Not Listed
Triangle Moonwort	*Botrychium lanceolatum*	Yellow	Not Listed	Not Listed	Not Listed
Triangular-valve Dock	*Rumex triangulivalvis*	Yellow	Not Listed	Not Listed	Not Listed
Tubercled Orchid	*Platanthera flava*	Yellow	Not Listed	Not Listed	Not Listed
Tubercled Spike-rush	*Eleocharis tuberculosa*	Red	Special Concern	Threatened	Threatened
Tuckerman's Panic Grass	*Panicum tuckermanii*	Yellow	Not Listed	Not Listed	Not Listed
Tuckerman's Sedge	*Carex tuckermanii*	Red	Not Listed	Not Listed	Not Listed
Virginia Anemone	*Anemone virginiana*	Yellow	Not Listed	Not Listed	Not Listed
Water Beggarticks	*Bidens beckii*	Yellow	Not Listed	Not Listed	Not Listed
Water Blinks	*Montia fontana*	Red	Not Listed	Not Listed	Not Listed
Water Pygmyweed	*Crassula aquatica*	Yellow	Not Listed	Not Listed	Not Listed
Water-pennywort	*Hydrocotyle umbellata*	Red	Threatened	Threatened	Endangered
Wavy-leaved Aster	*Symphyotrichum undulatum*	Yellow	Not Listed	Not Listed	Not Listed
Western Hairy Rockcress	*Arabis hirsuta*	Red	Not Listed	Not Listed	Not Listed
White Adder's-Mouth	*Malaxis monophyllos*	Red	Not Listed	Not Listed	Not Listed
White Mountain Saxifrage	*Saxifraga paniculata*	Yellow	Not Listed	Not Listed	Not Listed
White Snakeroot	*Ageratina altissima*	Red	Not Listed	Not Listed	Not Listed
White-stemmed Pondweed	*Potamogeton praelongus*	Yellow	Not Listed	Not Listed	Not Listed
Whorled Water Milfoil	*Myriophyllum verticillatum*	Yellow	Not Listed	Not Listed	Not Listed
Wiegand's Sedge	*Carex wiegandii*	Red	Not Listed	Not Listed	Not Listed
Wiegand's Wild Rye	*Elymus wiegandii*	Red	Not Listed	Not Listed	Not Listed
Wild Comfrey	*Cynoglossum virginianum*	Red	Not Listed	Not Listed	Not Listed
Wild Leek	*Allium tricoccum*	Red	Not Listed	Not Listed	Not Listed
Wood Anemone	*Anemone quinquefolia*	Yellow	Not Listed	Not Listed	Not Listed
Woodland Rush	*Juncus subcaudatus*	Yellow	Not Listed	Not Listed	Not Listed
Yellow Ladies'-tresses	*Spiranthes ochroleuca*	Yellow	Not Listed	Not Listed	Not Listed
Yellow Lady's-slipper	*Cypripedium parviflorum*	Yellow	Not Listed	Not Listed	Not Listed
Yellow Spikerush	*Eleocharis flavescens*	Yellow	Not Listed	Not Listed	Not Listed
Non-Vascular Plants					
Metropolitan Timmia Moss	*Timmia megapolitana*	Yellow	Not Listed	Not Listed	Not Listed
Toothed-leaved Nitrogen Moss	*Tetraplodon angustatus*	Yellow	Not Listed	Not Listed	Not Listed
Tufted Fen Moss	*Paludella squarrosa*	Yellow	Not Listed	Not Listed	Not Listed
Wulf's Peat Moss	*Sphagnum wulfianum*	Yellow	Not Listed	Not Listed	Not Listed

Common Name	Scientific Name	NSDNR Status	COSEWIC Status	SARA Status	NSESA Status
Lichens					
Appressed Jellyskin Lichen	*Leptogium subtile*	Yellow	Not Listed	Not Listed	Not Listed
Beaded Jellyskin Lichen	*Leptogium teretiusculum*	Yellow	Not Listed	Not Listed	Not Listed
Black-foam Lichen	*Anzia colpodes*	Yellow	Not Listed	Not Listed	Not Listed
Blistered Jellyskin Lichen	*Leptogium corticola*	Yellow	Not Listed	Not Listed	Not Listed
Blistered Tarpaper Lichen	*Collema furfuraceum*	Yellow	Not Listed	Not Listed	Not Listed
Boreal Felt Lichen - Atlantic pop.	*Erioderma pedicellatum*	Red	Endangered	Endangered	Endangered
Common Chocolate-chip Lichen	*Solorina saccata*	Red	Not Listed	Not Listed	Not Listed
Crumpled Bat's Wing Lichen	*Collema leptaleum*	Yellow	Not Listed	Not Listed	Not Listed
Eyed Mossthorns Woollybear Lichen	*Polychidium muscicola*	Red	Not Listed	Not Listed	Not Listed
Ghost Antler Lichen	*Pseudevernia cladonia*	Yellow	Not at Risk	No Status	Not Listed
Naked Kidney Lichen	*Nephroma bellum*	Yellow	Not Listed	Not Listed	Not Listed
Peppered Moon Lichen	*Sticta fuliginosa*	Yellow	Not Listed	Not Listed	Not Listed
Pimpled Kidney Lichen	*Nephroma resupinatum*	Red	Not Listed	Not Listed	Not Listed
Poor-man's Shingles Lichen	*Parmeliella parvula*	Red	Not Listed	Not Listed	Not Listed
Powdered Moon Lichen	*Sticta limbata*	Red	Not Listed	Not Listed	Not Listed
Powder-tipped Antler Lichen	*Everniastrum catawbiense*	Red	Not Listed	Not Listed	Not Listed
Rimmed Shingles Lichen	*Fuscopannaria leucosticta*	Red	Not Listed	Not Listed	Not Listed
Scaly Fringe Lichen	*Heterodermia squamulosa*	Yellow	Not Listed	Not Listed	Not Listed
Scaly Pelt Lichen	*Peltigera lepidophora*	Red	Not Listed	Not Listed	Not Listed
Stretched Jellyskin Lichen	*Leptogium milligranum*	Yellow	Not Listed	Not Listed	Not Listed
Tattered Jellyskin Lichen	*Leptogium lichenoides*	Red	Not Listed	Not Listed	Not Listed
Tree Pelt Lichen	*Peltigera collina*	Yellow	Not Listed	Not Listed	Not Listed
Vole Ears Lichen	*Erioderma mollissimum*	Red	Endangered	No Status	Not Listed

Latin Name	Common Name	Habitats			DNR General Status Ranks	Provincial (NS) - listed Species	SARA-listed species
		Woodland	Wetland	Cutover			
Abies balsamea	Balsam Fir	x	x	x	Green	-	-
Acer rubrum	Red Maple	x	x	x	Green	-	-
Alnus incana	Speckled Alder	x			Green	-	-
Amelanchier sp.	A shadbush			x	-	-	-
Aralia hispida	Bristly Sarsaparilla			x	Green	-	-
Aralis nudicaulis	Wild Sarsaparilla	x		x	Green	-	-
Aster sp.	An aster				-	-	-
Betula papyrifera	White Birch	x		x	Green	-	-
Betula populifolia	Wire Birch	x		x	Green	-	-
Calamagrostis canadensis	Blue-joint	x		x	Green	-	-
Carex albicans var. *emmonsii*	Emmons Sedge			x	Green	-	-
Carex brunnescens	Brownish Sedge	x	x	x	Green	-	-
Carex canescens	Hoary Sedge			x	Green	-	-
Carex communis	Fibrous-root Sedge			x	Green	-	-
Carex crinita	Fringed Sedge	x		x	Green	-	-
Carex debilis var. *rudgei*	White-edge Sedge	x		x	Green	-	-
Carex echinata	Prickly Sedge			x	Green	-	-
Carex intumescens	Bladder sedge			x	Green	-	-
Carex nigra	Black Sedge			x	Green	-	-
Carex sp. (Section *Ovales*)	A sedge			x	-	-	-
Carex trisperma	Three-seeded Sedge		x		Green	-	-
Comptonia peregrina	Sweet-fern			x	Green	-	-
Coptis trifolia	Goldthread	x	x	x	Green	-	-
Cornus canadensis	Bunchberry	x	x	x	Green	-	-
Cypripedium acaule	Pink Lady's-slipper	x			Green	-	-
Dennstaedtia punctilobula	Hay-scented Fern	x		x	Green	-	-
Diervilla lonicera	Bush Honey-suckle			x	Green	-	-
Doellingeria umbellata	Tall White Aster	x		x	Green	-	-
Drosera rotundifolia	Round-leaved Sundew			x	Green	-	-
Eleocharis tenuis	Slender Spike-rush			x	Green	-	-
Epigaea repens	Mayflower		x		Green	-	-
Gaultheria hispidula	Creeping Snowberry		x		Green	-	-
Gaylussacia baccata	Huckleberry	x	x	x	Green	-	-

Latin Name	Common Name	Habitats			DNR General Status Ranks	Provincial (NS) - listed Species	SARA-listed species
		Woodland	Wetland	Cutover			
Hamemalis virginiana	Witch-hazel	x	x		Green	-	-
Hieracium piloselloides	Hawkweed			x	Exotic	-	-
Juncus effusus s.l.	Soft Rush	x		x	Green	-	-
Juncus tenuis	Path Rush			x	Green		
Kalmia angustifolia	Sheep Laurel	x	x	x	Green	-	-
Ledum groenlandicum	Labrador-tea		x		Green	-	-
Luzula multiflora	Common Woodrush	x			Green	-	-
Lycopodium annotinum	Stiff Clubmoss	x			Green	-	-
Lycopodium obscurum s.s.	Tree Clubmoss	x			Green	-	-
Lysimachia terrestris	Swamp Candle			x	Green	-	-
Maianthemum canadensis	Wild Lily-of-the-valley	x	x	x	Green	-	-
Medeola virginiana	Indian Cucumber-root	x			Green	-	-
Mitchella repens	Partridgeberry	x	x	x	Green	-	-
Nemopanthus mucronata	Mountain Holly	x	x	x	Green	-	-
Oclemena acuminata	Wood Aster	x			Green	-	-
Osmunda cinnamomea	Cinnamon Fern	x	x	x	Green	-	-
Picea glauca	White Spruce	x		x	Green	-	-
Picea mariana	Black Spruce	x	x		Green	-	-
Picea rubens	Red Spruce	x			Green	-	-
Pinus strobus	White Pine	x			Green		
Potentilla simplex	Old-field Cinquefoil			x	Green	-	-
Prenanthes sp.	A rattlesnake-root	x			Green	-	-
Pteridium aquilinum	Bracken	x		x	Green	-	-
Rubus allegheniensis	Common Blackberry			x	Green	-	-
Rubus hispidus	Bristly Dewberry	x	x	x	Green	-	-
Rubus idaeus var. *strigosus*	Wild Raspberry			x	Exotic	-	-
Scirpus spp. (2)	Bulrush species			x	-	-	-
Solidago rugosa	Rough Goldenrod	x		x	Green	-	-
Sorbus decora	Northern Mountain-ash	x			Green	-	-
Spiraea tomentosa	Hardhack Spiraea	x			Green	-	-
Thelypteris noveboracensis	New York Fern	x	x	x	Green	-	-

Latin Name	Common Name	Habitats			DNR General Status Ranks	Provincial (NS) - listed Species	SARA-listed species
		Woodland	Wetland	Cutover			
Triadenum sp.	A marsh St. John's-wort			x	Green	-	-
Trientalis borealis	Starflower	x	x	x	Green	-	-
Trillium undulatum	Painted Trillium	x	x		Green	-	-
Vaccinium angustifolium	Lowbush Blueberry	x	x	x	Green	-	-
Vaccinium myrtilloides	Velvet-leaf Blueberry	x	x	x	Green	-	-
Viburnum nudum var. *cassinoides*	Wild Raisin	x	x	x	Green	-	-

APPENDIX B
BIRD SURVEY RESULTS

WLD NUM	Name
AP122	American Black Duck
AP4	American Black Duck
AP99	American Black Duck
CU198	American Black Duck
HX79	American Black Duck
HX385	American Black Duck
HX367	American Black Duck
HX363	American Black Duck
HX294	American Black Duck
HX273	American Black Duck
KI3	American Black Duck
LU16	American Black Duck
LU220	American Black Duck
LU223	American Black Duck
LU224	American Black Duck
LU1	Arctic Tern
LU2	Arctic Tern
LU33	Arctic Tern
LU35	Arctic Tern
QU384	Arctic Tern
HN20	Area used by gray partridge, population is declining in this area
HN30	Area used by gray partridge, population is declining in this area
LU1	Atlantic Puffin
LU2	Atlantic Puffin
AP11	Bald Eagle
AP113	Bald Eagle
AP114	Bald Eagle
AP115	Bald Eagle
AP116	Bald Eagle
AP3	Bald Eagle
AP47	Bald Eagle
CO37	Bald Eagle
HX26	Bald Eagle
HX30	Bald Eagle
HX41	Bald Eagle
HX65	Bald Eagle
HX76	Bald Eagle
HX90	Bald Eagle
HX95	Bald Eagle
HX114	Bald Eagle
HX118	Bald Eagle
HX639	Bald Eagle
HX640	Bald Eagle
HX641	Bald Eagle
HX643	Bald Eagle
HN31	Bald Eagle
HN41	Bald Eagle
HN327	Bald Eagle
KI7	Bald Eagle
KI8	Bald Eagle
KI118	Bald Eagle
KI148	Bald Eagle
KI17	Bald Eagle
KI18	Bald Eagle
KI20	Bald Eagle
KI21	Bald Eagle
KI22	Bald Eagle
KI23	Bald Eagle
KI196	Bald Eagle
KI3	Bald Eagle

WLD NUM	Name
KI197	Bald Eagle
KI198	Bald Eagle
LU46	Bald Eagle
LU50	Bald Eagle
LU57	Bald Eagle
LU250	Bald Eagle
LU251	Bald Eagle
QU405	Bald Eagle
QU59	Bald Eagle
QU60	Bald Eagle
QU63	Bald Eagle
QU486	Bald Eagle
QU93	Bald Eagle
KI203	Bald Eagle
KI204	Bald Eagle
KI205	Bald Eagle
KI206	Bald Eagle
KI207	Bald Eagle
KI208	Bald Eagle
KI209	Bald Eagle
KI210	Bald Eagle
CO121	Bald Eagle
CO9	Bald Eagle
CU18	Bald Eagle
HN5045	Bald Eagle
HN1	Bald Eagle
CO356	Bald Eagle
HN5291	Bald Eagle
CO50	Bald Eagle
CO287	Bald Eagle
CU11	Black Guillemot
LU9	Black Guillemot
LU10	Black Guillemot
LU13	Black Guillemot
LU15	Black-bellied Plover
LU202	Black-bellied Plover
LU21	Black-bellied Plover
LU1	Black-legged Kittiwake
AP122	Blue-winged Teal
KI3	Brant
HX300	Broad-winged Hawk
AP4	Bufflehead
AP99	Canada Goose
HX79	Canada Goose
HX385	Canada Goose
HX367	Canada Goose
HX363	Canada Goose
HX294	Canada Goose
LU226	Canada Goose
CU11	Common Eider
HX137	Common Eider
HX250	Common Eider
HX465	Common Eider
HX276	Common Eider
HX360	Common Eider
KI3	Common Eider
LU1	Common Eider
LU7	Common Eider
LU109	Common Eider
LU11	Common Eider
LU13	Common Eider
LU16	Common Eider
LU21	Common Eider

WLD NUM	Name
LU221	Common Eider
LU222	Common Eider
LU224	Common Eider
LU225	Common Eider
LU226	Common Eider
LU227	Common Eider
LU23	Common Eider
LU33	Common Eider
LU75	Common Eider
LU255	Common Eider
QU425	Common Eider
QU444	Common Eider
AP4	Common Goldeneye
AP99	Common Goldeneye
LU220	Common Goldeneye
LU227	Common Goldeneye
QU425	Common Goldeneye
QU444	Common Goldeneye
AP10	Common Loon
AP11	Common Loon
AP129	Common Loon
AP13	Common Loon
AP14	Common Loon
AP147	Common Loon
AP15	Common Loon
AP154	Common Loon
AP16	Common Loon
AP19	Common Loon
AP26	Common Loon
AP3	Common Loon
AP42	Common Loon
AP43	Common Loon
AP99	Common Loon
AP4	Common Loon
CO57	Common Loon
HX150	Common Loon
HX164	Common Loon
HX197	Common Loon
HX219	Common Loon
HX224	Common Loon
HX232	Common Loon
HX264	Common Loon
HX480	Common Loon
HX440	Common Loon
HX467	Common Loon
HN304	Common Loon
HN79	Common Loon
KI1	Common Loon
KI138	Common Loon
KI170	Common Loon
KI28	Common Loon
KI29	Common Loon
KI30	Common Loon
KI31	Common Loon
KI32	Common Loon
KI80	Common Loon
KI81	Common Loon
KI82	Common Loon
LU3	Common Loon
LU14	Common Loon
LU65	Common Loon
LU152	Common Loon

WLD NUM	Name
LU67	Common Loon
LU69	Common Loon
LU70	Common Loon
LU72	Common Loon
LU73	Common Loon
LU74	Common Loon
LU76	Common Loon
LU78	Common Loon
LU79	Common Loon
LU80	Common Loon
LU81	Common Loon
LU82	Common Loon
LU162	Common Loon
QU35	Common Loon
QU66	Common Loon
QU67	Common Loon
QU68	Common Loon
QU69	Common Loon
QU70	Common Loon
QU71	Common Loon
QU142	Common Loon
QU74	Common Loon
QU76	Common Loon
QU80	Common Loon
QU81	Common Loon
QU83	Common Loon
QU84	Common Loon
QU85	Common Loon
QU86	Common Loon
QU461	Common Loon
QU463	Common Loon
QU464	Common Loon
HX650	Common Loon
HN5179	Common Loon
AP122	Common Merganser
AP4	Common Merganser
AP99	Common Merganser
LU9	Common Merganser
HX3	Common Tern
HX22	Common Tern
HX31	Common Tern
HX56	Common Tern
HX99	Common Tern
HX112	Common Tern
HX173	Common Tern
HX460	Common Tern
LU2	Common Tern
LU9	Common Tern
LU11	Common Tern
LU110	Common Tern
LU111	Common Tern
LU119	Common Tern
LU33	Common Tern
LU35	Common Tern
LU68	Common Tern
LU3	Common Tern
QU9	Common Tern
QU14	Common Tern
QU384	Common Tern
QU142	Common Tern
QU74	Common Tern
LU6	Cormorant (unclassified)

WLD NUM	Name
LU13	Cormorant (unclassified)
LU200	Cormorant (unclassified)
LU23	Cormorant (unclassified)
LU7	Cormorant (unclassified)
LU108	Cormorant (unclassified)
QU493	Cormorant (unclassified)
LU260	Cormorant (unclassified)
HX99	Cormorant (unclassified)
HX652	Cormorant (unclassified)
HX112	Cormorant (unclassified)
HX587	Cormorant (unclassified)
HX656	Cormorant (unclassified)
KI4	Cormorant (unclassified)
KI3	Cormorant (unclassified)
CU11	Double-crested Cormorant
HX587	Double-crested Cormorant
HX634	Double-crested Cormorant
KI3	Double-crested Cormorant
KI4	Double-crested Cormorant
LU7	Double-crested Cormorant
LU8	Double-crested Cormorant
LU108	Double-crested Cormorant
LU109	Double-crested Cormorant
LU11	Double-crested Cormorant
LU14	Double-crested Cormorant
LU16	Double-crested Cormorant
LU33	Double-crested Cormorant
LU75	Double-crested Cormorant
LU99	Double-crested Cormorant
QU387	Double-crested Cormorant
HX652	Double-crested Cormorant
HX653	Double-crested Cormorant
HX655	Double-crested Cormorant
HX656	Double-crested Cormorant
HX659	Double-crested Cormorant
LU260	Double-crested Cormorant
LU261	Double-crested Cormorant
LU262	Double-crested Cormorant
QU493	Double-crested Cormorant
HX112	Double-crested Cormorant
HX99	Double-crested Cormorant
LU13	Double-crested Cormorant
LU23	Double-crested Cormorant
QU400	Double-crested Cormorant
QU87	Double-crested Cormorant
CU14	Double-crested Cormorant
CO285	Double-crested Cormorant
LU202	Dowitcher (unclassified)
KI3	Dunlin
LU202	Dunlin
CO25	Eagle nest
CO27	Eagle nest
CO45	Eagle nest
CO21	Eagle nest
CO36	Eagle nest
HN5071	Eagle nest
HN5053	Eagle nest
HN5070	Eagle nest
HN7	Eagle nest
HN10	Eagle nest
HN15	Eagle nest
HN14	Eagle nest

WLD NUM	Name
HN5292	Eagle nest
CO361	Eagle nest
HX638	Eagle nest
HN5294	Eagle nest
HX642	Eagle nest
HN324	Eagle nest
HN325	Eagle nest
HN326	Eagle nest
HN328	Eagle nest
HN329	Eagle nest
HN5	Eagle nest
CO366	Eagle nest
HN330	Eagle nest
HX104	Eagle nest, may be inactive
CO115	Eagle nest, may be inactive
HN35	Eagle nest, may be inactive
HN24	Eagle nest, may be inactive
HN28	Eagle nest, may be inactive
CO367	Eagle nest, no recent records so may be an alternate site for CO25
CO349	Eagles congregate to feed on spawning gaspereau
HN101	Feeding area for shorebirds
HN102	Feeding area for shorebirds
LU15	Fox Sparrow
HX478	Grand Lake, loon nesting
AP110	Great Black-backed Gull
CU11	Great Black-backed Gull
KI3	Great Black-backed Gull
LU1	Great Black-backed Gull
LU5	Great Black-backed Gull
LU6	Great Black-backed Gull
LU7	Great Black-backed Gull
LU108	Great Black-backed Gull
LU109	Great Black-backed Gull
LU119	Great Black-backed Gull
LU13	Great Black-backed Gull
LU14	Great Black-backed Gull
LU16	Great Black-backed Gull
LU233	Great Black-backed Gull
LU33	Great Black-backed Gull
LU24	Great Black-backed Gull
QU387	Great Black-backed Gull
QU142	Great Black-backed Gull
QU74	Great Black-backed Gull
AP99	Great Blue Heron
CU11	Great Blue Heron
HX92	Great Blue Heron
HX137	Great Blue Heron
HX215	Great Blue Heron
HX250	Great Blue Heron
HX426	Great Blue Heron
HX609	Great Blue Heron
HX635	Great Blue Heron
KI3	Great Blue Heron
LU4	Great Blue Heron
LU109	Great Blue Heron
LU11	Great Blue Heron
LU14	Great Blue Heron
LU15	Great Blue Heron
LU16	Great Blue Heron
LU17	Great Blue Heron

WLD NUM	Name
LU200	Great Blue Heron
LU201	Great Blue Heron
LU233	Great Blue Heron
LU33	Great Blue Heron
LU39	Great Blue Heron
LU47	Great Blue Heron
LU75	Great Blue Heron
LU83	Great Blue Heron
LU24	Great Blue Heron
QU397	Great Blue Heron
QU46	Great Blue Heron
HX654	Great Blue Heron
CU13	Great Blue Heron
LU224	Great Cormorant
LU225	Great Cormorant
HX656	Great Cormorant
AP4	Greater Scaup
AP99	Greater Scaup
LU202	Greater Yellowlegs
AP122	Green-winged Teal
LU10	Gull (unclassified)
LU64	Gull (unclassified)
QU14	Gull (unclassified)
HN5293	Gypsum sink hole pond, no species recorded
HX645	Harlequin Duck
HX646	Harlequin Duck
KI202	Harlequin Duck
LU1	Harlequin Duck
LU257	Harlequin Duck
LU258	Harlequin Duck
QU492	Harlequin Duck
AP179	Harlequin Duck
CU11	Herring Gull
KI3	Herring Gull
LU1	Herring Gull
LU5	Herring Gull
LU6	Herring Gull
LU7	Herring Gull
LU9	Herring Gull
LU108	Herring Gull
LU109	Herring Gull
LU13	Herring Gull
LU14	Herring Gull
LU16	Herring Gull
LU233	Herring Gull
LU33	Herring Gull
LU24	Herring Gull
QU387	Herring Gull
AP122	Hooded Merganser
HX250	Leach's Storm-Petrel
LU1	Leach's Storm-Petrel
LU13	Leach's Storm-Petrel
LU23	Leach's Storm-Petrel
LU202	Least Sandpiper
LU32	Least Sandpiper
HN303	Long Lake, loon nesting
HN300	Loon nesting
HN295	Loon nesting
HN297	Loon nesting
HN293	Loon nesting
HN82	Loon nesting
HN301	Loon nesting

WLD NUM	Name
HN299	Loon nesting
KI177	Loon nesting
LU237	Loon nesting
HN285	Loon nesting
HN5149	Loon nesting (site includes part of Grand Lake), eagle wintering
CO368	Loon nesting, waterfowl congregating
AP122	Mallard
AP99	Mallard
HX244	Migratory birds
HX10	Nelson's Sharp-tailed Sparrow
KI190	Northern Goshawk
CO118	Northern Goshawk
HX256	Northern Harrier
LU9	Northern Harrier
LU14	Northern Harrier
AP4	Oldsquaw
AP99	Oldsquaw
LU220	Oldsquaw
LU224	Oldsquaw
AP3	Osprey
AP99	Osprey
HX151	Osprey
HX175	Osprey
HX609	Osprey
LU114	Osprey
LU205	Osprey
LU14	Osprey
LU16	Osprey
LU17	Osprey
LU198	Osprey
LU199	Osprey
LU200	Osprey
LU22	Osprey
LU24	Osprey
LU25	Osprey
LU26	Osprey
LU27	Osprey
LU28	Osprey
LU29	Osprey
LU30	Osprey
LU31	Osprey
LU32	Osprey
LU33	Osprey
LU34	Osprey
LU36	Osprey
LU37	Osprey
LU38	Osprey
LU39	Osprey
LU40	Osprey
LU41	Osprey
LU42	Osprey
LU44	Osprey
LU45	Osprey
LU48	Osprey
LU49	Osprey
LU56	Osprey
LU57	Osprey
LU58	Osprey
LU59	Osprey
LU60	Osprey
LU61	Osprey

WLD NUM	Name
LU62	Osprey
LU63	Osprey
LU75	Osprey
LU83	Osprey
LU85	Osprey
LU86	Osprey
LU87	Osprey
LU89	Osprey
LU90	Osprey
LU234	Osprey
QU14	Osprey
QU15	Osprey
QU394	Osprey
QU395	Osprey
QU396	Osprey
QU401	Osprey
QU402	Osprey
QU403	Osprey
QU410	Osprey
QU56	Osprey
QU57	Osprey
QU94	Osprey
AP184	Peregrine Falcon
CU12	Peregrine Falcon
CU516	Peregrine Falcon
CU521	Peregrine Falcon
CU201	Peregrine Falcon
HX587	Peregrine Falcon
KI6	Peregrine Falcon
KI189	Peregrine Falcon
CU15	Peregrine Falcon
CU16	Peregrine Falcon
CU520	Peregrine Falcon
HX183	Piping Plover
HX260	Piping Plover
HX345	Piping Plover
HX347	Piping Plover
HX371	Piping Plover
HX377	Piping Plover
HX389	Piping Plover
HX407	Piping Plover
HX460	Piping Plover
HX588	Piping Plover
LU125	Piping Plover
LU16	Piping Plover
LU19	Piping Plover
LU191	Piping Plover
LU195	Piping Plover
LU20	Piping Plover
LU202	Piping Plover
LU21	Piping Plover
LU22	Piping Plover
LU32	Piping Plover
QU9	Piping Plover
QU10	Piping Plover
QU384	Piping Plover
QU89	Piping Plover
LU259	Piping Plover
LU1	Purple Sandpiper
AP122	Pygmy Shrew
LU1	Razorbill
LU202	Red Knot

WLD NUM	Name
LU11	Red-breasted Merganser
AP122	Ring-necked Duck
HX99	Roseate Tern
HX112	Roseate Tern
HX585	Roseate Tern
HX371	Roseate Tern
LU1	Roseate Tern
LU2	Roseate Tern
LU35	Roseate Tern
LU112	Roseate Tern
LU119	Roseate Tern
LU23	Roseate Tern
LU202	Ruddy Turnstone
LU15	Sanderling
LU202	Sanderling
LU21	Sanderling
LU33	Sanderling
LU220	Scoter (unclassified)
LU226	Scoter (unclassified)
LU227	Scoter (unclassified)
QU425	Scoter (unclassified)
LU15	Semipalmated Plover
LU16	Semipalmated Plover
LU202	Semipalmated Plover
LU21	Semipalmated Plover
LU33	Semipalmated Plover
CO198	Shorebirds
CO199	Shorebirds
CO209	Shorebirds
CU131	Shorebirds (unclassified)
CU161	Shorebirds (unclassified)
CU196	Shorebirds (unclassified)
CU200	Shorebirds (unclassified)
LU6	Shorebirds (unclassified)
LU19	Shorebirds (unclassified)
LU32	Shorebirds (unclassified)
QU391	Shorebirds (unclassified)
QU398	Shorebirds (unclassified)
CO184	Shorebirds (unclassified)
CO182	Shorebirds (unclassified)
CO245	Shorebirds (unclassified)
CO249	Shorebirds (unclassified)
CO237	Shorebirds (unclassified)
CO254	Shorebirds (unclassified)
CO250	Shorebirds (unclassified)
CO196	Shorebirds (unclassified)
CO195	Shorebirds (unclassified)
LU15	Short-billed Dowitcher
KI2	Southern Bight Minas Basin Ramsar site, wintering waterfowl including black ducks and Canada geese, migrating shorebirds including semipalmated plover, least sandpiper, short-billed dpwitcher and black-bellied plover
LU32	Spotted Sandpiper
LU33	Spotted Sandpiper
LU5	Tern (unclassified)
LU109	Tern (unclassified)
LU112	Tern (unclassified)
LU113	Tern (unclassified)
LU115	Tern (unclassified)
LU116	Tern (unclassified)
LU117	Tern (unclassified)
LU118	Tern (unclassified)
LU14	Tern (unclassified)

WLD NUM	Name
LU64	Tern (unclassified)
LU88	Tern (unclassified)
QU399	Tern (unclassified)
QU400	Tern (unclassified)
QU56	Tern (unclassified)
QU87	Tern (unclassified)
QU88	Tern (unclassified)
QU89	Tern (unclassified)
HX661	Tern (unclassified)
HX99	Tern (unclassified)
HX112	Tern (unclassified)
HX173	Tern (unclassified)
HX56	Tern (unclassified)
HX22	Tern (unclassified)
HX31	Tern (unclassified)
HX3	Tern (unclassified)
LU35	Tern (unclassified)
LU2	Tern (unclassified)
LU263	Tern (unclassified)
LU41	Tern (unclassified)
LU10	Tern (unclassified)
HX664	Tern (unclassified)
HX668	Tern (unclassified)
LU59	Tern (unclassified)
HX585	Tern (unclassified)
LU75	Tern (unclassified)
LU119	Tern (unclassified)
LU264	Tern (unclassified)
HX260	Tern (unclassified)
HX587	Tern (unclassified)
AP179	Waterfowl (unclassified)
KI200	Waterfowl (unclassified)
LU202	White-rumped Sandpiper
LU15	Willet
LU19	Willet
LU201	Willet
LU202	Willet
LU21	Willet
LU32	Willet
LU33	Willet
AP122	Wood Duck

Table B2: Kaizer Meadow Wind Farm - Fall Migration Survey Results ***Project # 12-4360***

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)
				Wind	Temperature	Sky	Precipitation				
06-Nov-11	Kaiz 088	0400690 4953424	Young -mid-aged mix coniferous-Black Spruce stand	10 km SW	-3	Clear	None	6:50 AM	American Crow	6	0-50
									American Robin	11	0-50
									Common Raven	8	0-50
									Pine Siskin	4	0-50
									Ruby-crowned Kinglet	4	0-50
	Kaiz 089	0401021 4953323	Young -mid-aged mix coniferous-Black Spruce stand	10 km SW	-3	Clear	None	7:04AM	American Goldfinch	2	0-50
									Black-capped Chickadee	9	0-50
									Brown Creeper	1	0-50
									Dark-eyed Junco	9	0-50
									Northern Flicker	1	0-50
									Purple Finch	2	0-50
									Purple Finch	3	F/O
									Ruby-crowned Kinglet	6	0-50
									Red-breasted Nuthatch	2	0-50
	Kaiz 090	0401550 4953211	Young -mid-aged mix coniferous-Black Spruce stand	10 km SW	-3	Clear	None	7:23AM	American Crow	14	0-50
									American Goldfinch	2	0-50
									American Robin	8	0-50
									Blue Jay	6	50-100
									Common Raven	9	0-50
									Dark-eyed Junco	8	0-50
									Northern Flicker	3	0-50
									Pileated Woodpecker	1	0-50
									Purple Finch	4	0-50
									Red-breasted Nuthatch	2	0-50
									Pine Siskin	2	F/O
									Black-capped Chickadee	7	0-50
									Gray Jay	1	0-50
									White-winged Crossbill	6	F/O
	Kaiz 091	0399959 4953235	Young -mid-aged mix coniferous-Black Spruce stand	10 km SW	-3	Clear	None	8:04AM	American Crow	16	0-50
									American Goldfinch	4	0-50
									American Robin	8	0-50
									Common Raven	9	0-50
									Purple Finch	2	0-50
									Yellow-rumped Warbler	2	0-50
									Rusty Blackbird	1	F/O
									Boreal Chickadee	2	F/O SW
									Golden-crowned Kinglet	2	0-50
									Red-breasted Nuthatch	2	0-50
									Ruby-crowned Kinglet	6	0-50

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Table B2: Kaizer Meadow Wind Farm - Fall Migration Survey Results (pg 2) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)
				Wind	Temperature	Sky	Precipitation				
	Kaiz 014	0400735 4953404	Young -mid-aged mix coniferous-Black Spruce stand	10 km SW	-3	Clear	None	8:30AM	American Crow	6	0-50
									Black-capped Chickadee	10	0-50
									Blue Jay	4	0-50
									Boreal Chickadee	6	0-50
									Dark-eyed Junco	9	0-50
									Golden-crowned Kinglet	6	0-50
									Gray Jay	2	0-50
									Pine Siskin	31	0-50
									Purple Finch	6	0-50
									Red-breasted Nuthatch	2	0-50
	Kaiz 094	0400122 4952871	Mixed conifer mid aged	10 km SW	-3	Clear	None	9:00AM	American Crow	2	0-50
									Brown Creeper	1	0-50
									Red-breasted Nuthatch	2	0-50
	Kaiz 092	0400475 4953168	Young -mid-aged mix coniferous-Black Spruce stand	10 km SW	-3	Clear	None	9:31AM	American Crow	2	0-50
									Black-capped Chickadee	6	0-50
									Common Raven	6	50-100
									Golden-crowned Kinglet	2	0-50
									Purple Finch	2	0-50
									Red-breasted Nuthatch	2	0-50
	Kaiz 005	0402292 4952916	Landfill	10 km SW	-3	Clear	None	9:46-11:00AM	American Black Duck	13	Unknown
									American Crow	62	Unknown
									American Goldfinch	7	Unknown
									Bald Eagle	3	Unknown
									Black-capped Chickadee	8	Unknown
									Common Raven	30	Unknown
									Dark-eyed Junco	4	Unknown
									European Starling	300	Unknown
									Golden-crowned Kinglet	4	Unknown
									Great Black-backed Gull	35	Unknown
									Herring Gull	154	Unknown
									Mallard	1	Unknown
									Pine Siskin	64	Unknown
									Red-breasted Nuthatch	2	Unknown
									Red-tailed Hawk	2	Unknown
									Song Sparrow	4	Unknown
									Turkey Vulture	1	Unknown
	Kaiz 093	0400153 4953254	Young -mid-aged mix coniferous-Black Spruce stand	10 km SW	1	Clear	None	11:16AM	Red-tailed Hawk	1	Unknown

Table B3: Kaizer Meadow Wind Farm - Winter Bird Survey Results *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)
				Wind	Temperature	Sky	Precipitation				
25-Mar-12	Kaiz001	0401795 4952978	Young -mid-aged mix coniferous	Calm	-2	Partially Cloudy	None	7:40AM	American Robin	4	0-50
									Black-capped Chickadee	2	0-50
									Blue Jay	6	0-50
									Dark-eyed Junco	1	0-50
									Pileated Woodpecker	1	0-50
									European Starling	40	50-100
									Mourning Dove	2	50-100
									Red-tailed Hawk	1	50-100
									American Crow	10	100+
									Bald Eagle	1	100+
									Common Raven	4	100+
	Kaiz002	0402087 4953047	Young -mid-aged mix coniferous	Calm	-2	Partially Cloudy	None	7:55 AM	American Goldfinch	2	0-50
									American Robin	8	0-50
									Blue Jay	12	0-50
									Common Raven	14	0-50
									Dark-eyed Junco	2	0-50
									European Starling	38	0-50
									Golden-crowned Kinglet	2	0-50
									Northern Shrike	1	0-50
									Red-breasted Nuthatch	2	0-50
									Song Sparrow	5	0-50
									Song Sparrow	4	50-100
									Bald Eagle	1	50-100
									Pine Siskin	22	50-100
									American Crow	8	100+
									Mourning Dove	2	100+
	Kaiz003	402278 4953287	Young -mid-aged mix coniferous	Calm	-2	Partially Cloudy	None	8:10 AM	American Goldfinch	14	0-50
									American Robin	8	0-50
									Black-capped Chickadee	10	0-50
									Mourning Dove	2	0-50
									Song Sparrow	1	0-50
									American Crow	4	50-100
									American Goldfinch	2	50-100
									American Robin	3	50-100
									Blue Jay	4	50-100
									Golden-crowned Kinglet	2	50-100
									Yellow-rumped Warbler	3	50-100
									Bald Eagle	1	100+
									Common Raven	4	100+
									Common Redpoll	2	100+
									Gray Jay	1	100+
									Pine Siskin	11	100+
									Purple Finch	2	100+
	Kaiz004	402445 4953108	Grassy field	Calm	-2	Partially Cloudy	None	8:25 AM	Herring Gull	120	0-50
									Great Black-backed Gull	10	0-50
									Ring-billed Gull	4	0-50
									American Crow	23	0-50
									Common Raven	83	0-50
									European Starling	7	0-50
									Spruce Grouse	1	0-50
									White-throated Sparrow	1	0-50
									White-winged Crossbill	1	0-50
									Yellow-rumped Warbler	1	0-50
									American Crow	11	100+
									American Goldfinch	3	100+
									Blue Jay	4	100+
									Hairy Woodpecker	1	100+
									Purple Finch	4	100+
									Song Sparrow	3	100+

Table B3: Kaizer Meadow Wind Farm - Winter Bird Survey Results (pg 2) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)
				Wind	Temperature	Sky	Precipitation				
	Kaiz005	402292 4952916	Center of landfill dumping area	Calm	-2	Partially Cloudy	None	8:40 AM	American Robin	37	0-50
									Song Sparrow	6	0-50
									European Starling	2	50-100
									American Crow	18	50-100
									Hermit Thrush	14	50-100
									Mourning Dove	1	50-100
									Northern Flicker	1	100+
									Common Grackle	6	100+
									Common Raven	8	100+
									Blue Jay	3	100+
									Pileated Woodpecker	1	100+
									Pine Siskin	2	100+
	Kaiz006	402414 4952691	Sewage Lagoons	Calm	-2	Partially Cloudy	None	8:55 AM	Killdeer	2	0-50
									Canada Goose	4	0-50
									American Black Duck	6	0-50
									Mallard	2	0-50
									Golden-crowned Kinglet	2	0-50
									Hermit Thrush	2	0-50
									Great Black-backed Gull	4	0-50
									Black-capped Chickadee	4	50-100
									Common Raven	10	50-100
									American Robin	12	50-100
									Dark-eyed Junco	1	50-100
									Blue Jay	5	50-100
	Kaiz007	402379 4952444	Young -mid-aged mix coniferous	Calm	-2	Partially Cloudy	None	9:10 AM	Song Sparrow	4	0-50
									Dark-eyed Junco	6	0-50
									Cedar Waxwing	1	0-50
									Black-capped Chickadee	4	0-50
									Ruby-crowned Kinglet	4	0-50
									American Goldfinch	8	0-50
									Great Black-backed Gull	3	0-50
									American Crow	6	50-100
									Pine Siskin	16	50-100
									American Robin	9	50-100
									Purple Finch	8	50-100
									Mourning Dove	6	100+
									Blue Jay	5	100+
									Pileated Woodpecker	1	100+
									Common Raven	12	100+
									Red-tailed Hawk	1	100+
	Kaiz008	402144 4952321	Young -mid-aged mix coniferous	Calm	-2	Partially Cloudy	None	9:25 AM	American Crow	1	0-50
									Song Sparrow	4	0-50
									Dark-eyed Junco	5	0-50
									Boreal Chickadee	4	0-50
									Downy Woodpecker	1	0-50
									Pine Siskin	4	0-50
									Song Sparrow	2	50-100
									Mourning Dove	4	50-100
									White-winged Crossbill	2	50-100
									Hairy Woodpecker	2	50-100
									American Robin	8	50-100
									Northern Flicker	1	50-100
									Cedar Waxwing	2	100+
									Common Raven	7	100+
									Common Grackle	7	100+
									Blue Jay	2	100+

Table B3: Kaizer Meadow Wind Farm - Winter Bird Survey Results (pg 3) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)
				Wind	Temperature	Sky	Precipitation				
	Kaiz009	401972 4952491	Young -mid-aged mix coniferous	Calm	-2	Partially Cloudy	None	9:45 AM	Song Sparrow	2	0-50
									Purple Finch	4	0-50
									Song Sparrow	5	50-100
									Hairy Woodpecker	2	50-100
									Mourning Dove	4	50-100
									Dark-eyed Junco	5	50-100
									Blue Jay	1	50-100
									Ovenbird	4	100+
									Bald Eagle	1	100+
									Great Black-backed Gull	1	100+
									Cedar Waxwing	9	100+
									Red-eyed Vireo	6	100+
	Kaiz010	401834 4952798	Young -mid-aged mix coniferous	Calm	-2	Partially Cloudy	None	10:00 AM	Dark-eyed Junco	5	0-50
									Hairy Woodpecker	1	0-50
									Boreal Chickadee	2	0-50
									Black-capped Chickadee	2	0-50
									Mourning Dove	4	50-100
									Pine Siskin	8	50-100
									Blue Jay	4	50-100
									Herring Gull	27	100+
									Great Black-backed Gull	2	100+
	Kaiz011	401619 4953158	Young -mid-aged mix coniferous-Black Spruce stand	Calm	-2	Partially Cloudy	None	10:20 AM	Pileated Woodpecker	1	0-50
									Golden-crowned Kinglet	2	0-50
									Hairy Woodpecker	1	0-50
									Boreal Chickadee	6	0-50
									Dark-eyed Junco	4	0-50
									Black-capped Chickadee	2	0-50
									Pine Siskin	2	50-100
									Mourning Dove	4	50-100
									Pileated Woodpecker	1	100+
									Red-eyed Vireo	10	100+
									American Crow	4	100+
	Kaiz012	401320 4953257	Young -mid-aged mix coniferous-Black Spruce stand	Calm	-2	Partially Cloudy	None	10:35 AM	Black-capped Chickadee	2	0-50
									Hairy Woodpecker	1	0-50
									Dark-eyed Junco	5	0-50
									Golden-crowned Kinglet	2	0-50
									Red-breasted Nuthatch	2	50-100
									European Starling	9	50-100
									Red-eyed Vireo	14	100+
									American Crow	7	100+
									Red-tailed Hawk	1	100+
	Kaiz013	401039 4953325	Young -mid-aged mix coniferous-Black Spruce stand	Calm	-2	Partially Cloudy	None	10:50 AM	Red-breasted Nuthatch	2	0-50
									American Robin	3	0-50
									Black-capped Chickadee	2	0-50
									Hairy Woodpecker	1	50-100
									Common Raven	1	50-100
									American Crow	7	100+
									Red-eyed Vireo	18	100+
									Bald Eagle	1	100+
									Blue Jay	5	100+
									Mourning Dove	2	100+

Table B3: Kaizer Meadow Wind Farm - Winter Bird Survey Results (pg 4) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)
				Wind	Temperature	Sky	Precipitation				
	Kaiz014	400735 4953404	Young -mid-aged mix coniferous-Black Spruce stand	Calm	-2	Partially Cloudy	None	11:05 AM	Hairy Woodpecker	1	0-50
									Black-capped Chickadee	2	0-50
									Red-breasted Nuthatch	2	0-50
									Dark-eyed Junco	9	0-50
									American Robin	5	0-50
									Pine Siskin	12	0-50
									Mourning Dove	2	50-100
									Blue Jay	4	50-100
									Common Grackle	7	50-100
									American Crow	8	100+
									Common Raven	10	100+
									Bald Eagle	1	100+
	Kaiz015	400479 4953172	Young -mid-aged mix coniferous-Black Spruce stand	Calm	-2	Partially Cloudy	None	11:25 AM	Mourning Dove	2	0-50
									American Robin	7	0-50
									Dark-eyed Junco	8	0-50
									Song Sparrow	2	0-50
									Black-capped Chickadee	4	0-50
									Hairy Woodpecker	1	0-50
									Mourning Dove	2	50-100
									Pine Siskin	4	50-100
									Red-breasted Nuthatch	1	50-100
									Common Raven	8	100+
									Ring-necked Pheasant	1	100+
									American Crow	2	100+

Table B4: Kaizer Meadow Wind Farm - Spring Migration Survey Results *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Individuals	Distance (me)	Pairs
				Wind	Temperature	Sky	Precipitation					
29-Apr-12	Kaiz001	0401795 4952978	Young -mid-aged mix coniferous	10 KM/h N	1	Clear	None	6:37AM	American Crow	2	100+	
									American Goldfinch	2	50-100	
									American Redstart	9	0-50	
									American Robin	4	50-100	
									American Robin	11	100+	
									Black-capped Chickadee	2	0-50	
									Common Raven	4	100+	
									European Starling	4	50-100	
									Hermit Thrush	1	0-50	
									Hermit Thrush	2	50-100	
									Hermit Thrush	2	100+	
									Northern Flicker	1	50-100	
									Northern Flicker	1	100+	
									Pileated Woodpecker	1	100+	
									Purple Finch	2	0-50	
									Red-breasted Nuthatch	1	100+	
									Winter Wren	1	100+	
									Yellow-rumped Warbler	1	0-50	
	Kaiz002	0402087 4953047	Young -mid-aged mix coniferous	10 KM/h N	1	Clear	None	6:57 AM	American Crow	14	0-50	
									American Crow	4	100+	
									American Goldfinch	2	100+	
									American Robin	9	100+	
									Bald Eagle	1	0-50	
									Bald Eagle	2	50-100	
									Black-capped Chickadee	1	50-100	
									Common Raven	8	0-50	
									Common Raven	6	50-100	
									Hermit Thrush	4	100+	
									Mourning Dove	1	50-100	
									Northern Flicker	1	50-100	
									Northern Flicker	1	100+	
									Purple Finch	2	100+	
									Song Sparrow	1	0-50	
									Song Sparrow	4	50-100	
									Swamp Sparrow	2	50-100	
									White-winged Crossbill	2	50-100	
	Kaiz003	402278 4953287	Young -mid-aged mix coniferous	10 KM/h N	1	Clear	None	7:12 AM	American Crow	6	100+	
									American Goldfinch	4	0-50	
									American Goldfinch	2	50-100	
									American Kestrel	1	50-100	
									American Robin	4	0-50	
									American Robin	5	50-100	
									American Robin	11	100+	
									Bald Eagle	1	100+	
									Black-capped Chickadee	2	0-50	1P
									Common Raven	4	100+	
									Golden-crowned Kinglet	2	0-50	
									Northern Flicker	1	100+	
									Song Sparrow	8	0-50	
									White-throated Sparrow	4	50-100	
	Kaiz004	402445 4953108	Grassy field	10 KM/h N	1	Clear	None	7:30 AM	American Crow	22	0-50	
									American Goldfinch	14	50-100	
									American Robin	2	50-100	
									American Robin	8	100+	
									Bald Eagle	1	100+	
									Common Raven	37	0-50	
									European Starling	18	0-50	

Table B4: Kaizer Meadow Wind Farm - Spring Migration Survey Results (pg 2) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Individuals	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
									Great Black-backed Gull	23	0-50	
									Hairy Woodpecker	1	100+	
									Hermit Thrush	1	100+	
									Herring Gull	18	0-50	
									Mourning Dove	2	100+	
									Red-breasted Nuthatch	2	0-50	
									Red-breasted Nuthatch	1	100+	
									Savannah Sparrow	2	50-100	
									Song Sparrow	1	0-50	
									Song Sparrow	4	50-100	
									Swamp Sparrow	2	50-100	
									Winter Wren	1	100+	
	Kaiz005	402292 4952916	Center of landfill dumping area	10 KM/h N	1	Clear	None	7:45 AM	American Crow	6	100+	
									American Goldfinch	2	0-50	
									American Robin	18	0-50	
									American Robin	4	50-100	
									American Robin	5	100+	
									Bald Eagle	1	100+	
									Common Raven	7	100+	
									Northern Flicker	1	100+	
									Red-winged Blackbird	1	50-100	
									Savannah Sparrow	4	0-50	
									Savannah Sparrow	1	50-100	
									Song Sparrow	6	0-50	
									Swamp Sparrow	2	50-100	
									White-throated Sparrow	2	50-100	
	Kaiz006	402414 4952691	Sewage Lagoons	10 KM/h N	1	Clear	None	8:00 AM	American Black Duck	2	0-50	1P
									American Crow	11	100+	
									American Goldfinch	4	50-100	
									American Robin	6	50-100	
									American Robin	5	100+	
									American Woodcock	1	100+	
									Canada Goose	4	0-50	
									Common Raven	5	100+	
									Hermit Thrush	1	50-100	
									Hermit Thrush	2	100+	
									Northern Flicker	1	100+	
									Ring-necked Duck	6	0-50	
									Ring-necked Pheasant	1	50-100	
									Song Sparrow	2	0-50	
									Song Sparrow	1	50-100	
									Winter Wren	1	100+	
	Kaiz007	402379 4952444	Young -mid-aged mix coniferous	10 KM/h N	1	Clear	None	8:15 AM	American Crow	2	100+	
									American Goldfinch	2	0-50	
									American Robin	1	0-50	
									American Robin	8	50-100	
									American Robin	4	100+	
									Black-capped Chickadee	2	0-50	
									Common Raven	4	100+	
									Dark-eyed Junco	2	50-100	
									Dark-eyed Junco	1	100+	
									Downy Woodpecker	1	100+	
									Golden-crowned Kinglet	1	50-100	
									Hermit Thrush	1	0-50	
									Hermit Thrush	2	50-100	
									Hermit Thrush	2	100+	
									Pine Siskin	10	50-100	
									Red-breasted Nuthatch	1	50-100	
									Song Sparrow	2	0-50	
									Swamp Sparrow	1	0-50	

Table B4: Kaizer Meadow Wind Farm - Spring Migration Survey Results (pg 3) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Individuals	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
	Kaiz008	402144 4952321	Young -mid-aged mix coniferous	10 KM/h N	1	Clear	None	8:30 AM	American Crow	2	50-100	
									American Crow	1	100+	
									American Robin	4	0-50	
									American Robin	4	50-100	
									American Robin	6	100+	
									Black-capped Chickadee	2	0-50	
									Blue Jay	2	0-50	
									Common Raven	4	100+	
									Dark-eyed Junco	2	0-50	
									Dark-eyed Junco	1	100+	
									Hairy Woodpecker	1	0-50	
									Hairy Woodpecker	1	50-100	
									Hermit Thrush	2	100+	
									Mourning Dove	1	50-100	
									Northern Flicker	1	100+	
									Purple Finch	2	50-100	
									Red-breasted Nuthatch	2	50-100	
									Song Sparrow	3	50-100	
									White-throated Sparrow	2	0-50	
									White-throated Sparrow	2	50-100	
									Winter Wren	1	100+	
	Kaiz009	401972 4952491	Young -mid-aged mix coniferous	10 KM/h N	1	Clear	None	8:45 AM	American Crow	1	100+	
									American Goldfinch	4	0-50	
									American Robin	2	0-50	
									American Robin	1	50-100	
									American Robin	7	100+	
									Black-capped Chickadee	2	50-100	
									Blue Jay	4	50-100	
									Blue Jay	2	100+	
									Boreal Chickadee	2	100+	
									Common Raven	2	100+	
									Dark-eyed Junco	2	0-50	
									European Starling	2	100+	
									Golden-crowned Kinglet	4	0-50	
									Hermit Thrush	3	100+	
									Mourning Dove	1	100+	
									Northern Flicker	1	50-100	
									Northern Flicker	1	100+	
									Pine Siskin	6	100+	
									White-throated Sparrow	4	0-50	
									Winter Wren	1	100+	
	Kaiz010	401834 4952798	Young -mid-aged mix coniferous	10 KM/h N	1	Clear	None	9:00 AM	American Crow	2	100+	
									American Robin	4	0-50	
									American Robin	4	50-100	
									American Robin	2	100+	
									Black-capped Chickadee	2	0-50	
									Blue Jay	2	50-100	
									Common Grackle	6	100+	
									European Starling	4	0-50	
									Mourning Dove	2	50-100	
									Northern Flicker	1	50-100	
									Ruby-crowned Kinglet	1	0-50	
									Song Sparrow	2	0-50	
									White-throated Sparrow	2	50-100	

Table B4: Kaizer Meadow Wind Farm - Spring Migration Survey Results (pg 4) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Individuals	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
	Kaiz011	401619 4953158	Young -mid-aged mix coniferous- Black Spruce stand	10 KM/h N	1	Clear	None	9:15 AM	American Crow	2	100+	
									American Goldfinch	4	50-100	
									American Robin	4	50-100	
									American Robin	6	100+	
									Black-capped Chickadee	2	0-50	
									Black-capped Chickadee	2	50-100	
									Common Raven	1	100+	
									Hermit Thrush	1	0-50	
									Hermit Thrush	3	100+	
									Mourning Dove	1	100+	
									Red-breasted Nuthatch	2	100+	
									Song Sparrow	1	0-50	
									White-throated Sparrow	4	0-50	
									Yellow-rumped Warbler	4	0-50	
	Kaiz012	401320 4953257	Young -mid-aged mix coniferous- Black Spruce stand	10 KM/h N	1	Clear	None	9:30 AM	American Crow	2	100+	
									American Robin	3	50-100	
									American Robin	5	100+	
									Black-capped Chickadee	4	0-50	
									Blue Jay	2	0-50	
									Blue Jay	2	50-100	
									Blue Jay	2	100+	
									Common Grackle	12	50-100	
									Golden-crowned Kinglet	2	0-50	
									Hermit Thrush	2	0-50	
									Northern Flicker	1	100+	
									Palm Warbler	1	0-50	
									Red-breasted Nuthatch	2	100+	
									Red-winged Blackbird	2	50-100	
									White-throated Sparrow	4	0-50	
									Yellow-rumped Warbler	2	50-100	
	Kaiz013	401039 4953325	Young -mid-aged mix coniferous- Black Spruce stand	10 KM/h N	1	Clear	None	9:50 AM	American Crow	4	100+	
									American Robin	2	50-100	
									American Robin	6	100+	
									Black-capped Chickadee	4	0-50	
									Dark-eyed Junco	2	0-50	
									Dark-eyed Junco	2	50-100	
									Hairy Woodpecker	1	0-50	
									Ruby-crowned Kinglet	2	50-100	
									Song Sparrow	2	0-50	
									White-throated Sparrow	16	0-50	
									Winter Wren	1	100+	
									Yellow-rumped Warbler	2	0-50	
	Kaiz014	400735 4953404	Young -mid-aged mix coniferous- Black Spruce stand	10 KM/h N	1	Clear	None	10:05 AM	American Robin	4	0-50	
									American Robin	4	50-100	
									Black-capped Chickadee	2	0-50	
									Blue Jay	2	50-100	
									Fox Sparrow	1	0-50	
									Red-breasted Nuthatch	1	0-50	
									Ruby-crowned Kinglet	2	0-50	
									White-throated Sparrow	2	0-50	
									Yellow-rumped Warbler	1	0-50	

Table B4: Kaizer Meadow Wind Farm - Spring Migration Survey Results (pg 5) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Individuals	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
	Kaiz015	400479 4953172	Young -mid-aged mix coniferous- Black Spruce stand	10 KM/h N	1	Clear	None	10:25 AM	American Crow	2	100+	
									American Crow	2	100+	
									American Robin	1	100+	
									American Woodcock	2	0-50	
									Black-capped Chickadee	2	0-50	
									Black-capped Chickadee	1	100+	
									Blue Jay	2	50-100	
									Hermit Thrush	1	50-100	
									Hermit Thrush	2	100+	
									Hermit Thrush	2	100+	
									Northern Flicker	1	0-50	
									Northern Flicker	1	100+	
									Pine Siskin	2	0-50	
									Purple Finch	2	50-100	
									Red-breasted Nuthatch	1	50-100	
									Red-breasted Nuthatch	1	50-100	
									Ruby-crowned Kinglet	2	0-50	
									Song Sparrow	1	50-100	
									Song Sparrow	4	0-50	
									White-throated Sparrow	6	0-50	
									White-winged Crossbill	8	50-100	
									Yellow-rumped Warbler	2	50-100	
									Yellow-rumped Warbler	5	0-50	
									Yellow-rumped Warbler	2	50-100	
20-May-12	Kaiz001	0401795 4952978	Young -mid-aged mix coniferous	10-20 km/h Sw	9	Clear	None	6:15 AM	American Crow	4	100+	
									American Robin	2	0-50	
									American Robin	6	50-100	
									American Robin	8	100+	
									Black-and-white Warbler	1	0-50	
									Black-capped Chickadee	2	0-50	
									Black-throated Green Warbler	2	50-100	
									Cedar Waxwing	2	0-50	
									Chipping Sparrow	1	0-50	
									Dark-eyed Junco	2	50-100	
									Dark-eyed Junco	2	100+	
									European Starling	4	0-50	
									Hermit Thrush	2	100+	
									Northern Parula	1	50-100	
									Northern Parula	1	100+	
									Ovenbird	1	0-50	
									Palm Warbler	2	0-50	
									Pileated Woodpecker	1	100+	
									Purple Finch	1	50-100	
									Red-breasted Nuthatch	1	0-50	
									Red-eyed Vireo	1	0-50	
									Ruby-crowned Kinglet	2	50-100	
									White-throated Sparrow	2	50-100	
									Winter Wren	1	100+	
									Yellow-rumped Warbler	2	0-50	
									Yellow-rumped Warbler	4	50-100	
									Yellow-rumped Warbler	5	100+	

Table B4: Kaizer Meadow Wind Farm - Spring Migration Survey Results (pg 6) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Individuals	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
	Kaiz002	0402087 4953047	Young -mid-aged mix coniferous	10-20 km/h Sw	9	Clear	None	6:35 AM	American Crow	2	100+	
									American Robin	6	100+	
									American Robin	9	100+	
									Bald Eagle	1	50-100	
									Bald Eagle	1	100+	
									Common Raven	8	0-50	
									European Starling	14	0-50	
									Great Black-backed Gull	2	0-50	
									Hermit Thrush	2	0-50	
									Hermit Thrush	2	100+	
									Ovenbird	1	100+	
									Red-tailed Hawk	1	100+	
									Red-winged Blackbird	2	100+	
									Ruby-crowned Kinglet	1	100+	
									Ruby-crowned Kinglet	2	100+	
									Song Sparrow	2	100+	
									Song Sparrow	1	100+	
									Swainson's Thrush	1	100+	
									Swainson's Thrush	2	100+	
									Swamp Sparrow	2	100+	
									Yellow Warbler	1	100+	
									Yellow-bellied Flycatcher	1	100+	
									Yellow-rumped Warbler	4	0-50	
	Kaiz003	402278 4953287	Young -mid-aged mix coniferous	10-20 km/h Sw	9	Clear	None	6:50 AM	Alder Flycatcher	1	0-50	
									American Crow	1	0-50	
									American Crow	6	100+	
									American Goldfinch	4	100+	
									American Redstart	1	100+	
									American Robin	2	100+	
									American Robin	2	100+	
									American Robin	4	100+	
									Blue Jay	1	100+	
									Blue Jay	2	50-100	
									Chestnut-sided Warbler	1	50-100	
									Chipping Sparrow	1	50-100	
									Common Raven	4	100+	
									Common Yellowthroat	2	100+	
									Dark-eyed Junco	2	0-50	
									Dark-eyed Junco	4	0-50	
									Eastern-wood Pewee	1	100+	
									Evening Grosbeak	2	100+	
									Ovenbird	1	100+	
									Savannah Sparrow	1	100+	
									Song Sparrow	4	0-50	
									White-throated Sparrow	4	0-50	
									Yellow Warbler	1	0-50	
									Yellow Warbler	1	0-50	
									Yellow-rumped Warbler	6	50-100	
									Yellow-rumped Warbler	4	100+	

Table B4: Kaizer Meadow Wind Farm - Spring Migration Survey Results (pg 7) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Individuals	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
	Kaiz004	402445 4953108	Grassy field	10-20 km/h Sw	9	Clear	None	7:10 AM	American Crow	19	100+	
									American Crow	8	50-100	
									American Crow	6	100+	
									American Robin	1	0-50	
									American Robin	4	50-100	
									American Robin	10	100+	
									Bald Eagle	2	100+	
									Common Raven	32	0-50	
									Common Raven	14	50-100	
									Common Raven	12	100+	
									European Starling	17	100+	
									Great Black-backed Gull	11	100+	
									Hermit Thrush	2	100+	
									Herring Gull	4	100+	
									Mourning Dove	2	100+	
									Ovenbird	1	100+	
									Ruby-crowned Kinglet	1	100+	
									Song Sparrow	2	50-100	
	Kaiz005	402292 4952916	Center of landfill dumping area	10-20 km/h Sw	9	Clear	None	7:25 AM	Alder Flycatcher	2	50-100	
									American Crow	2	100+	
									American Goldfinch	2	100+	
									American Robin	4	100+	
									American Robin	2	100+	
									American Robin	7	100+	
									Black-and-white Warbler	1	100+	
									Common Grackle	4	100+	
									Common Raven	2	100+	
									Dark-eyed Junco	2	100+	
									Hairy Woodpecker	1	100+	
									Hermit Thrush	2	100+	
									Killdeer	1	100+	
									Mourning Dove	2	100+	
									Northern Waterthrush	1	100+	
									Red-eyed Vireo	2	100+	
									Savannah Sparrow	2	0-50	
									Song Sparrow	4	0-50	
									Swainson's Thrush	2	100+	
									Swamp Sparrow	2	100+	
									Tennessee Warbler	1	100+	
									Tree Swallow	1	100+	
									Yellow-rumped Warbler	2	100+	
									Yellow-rumped Warbler	2	100+	
	Kaiz006	402414 4952691	Sewage Lagoons	10-20 km/h Sw	9	Clear	None	7:45 AM	Alder Flycatcher	2	100+	
									American Black Duck	2	100+	1P
									American Black Duck	1	0-50	
									American Crow	2	100+	
									American Goldfinch	2	100+	
									American Redstart	1	100+	
									American Robin	2	100+	
									American Robin	3	50-100	
									American Robin	6	100+	
									Black-and-white Warbler	1	100+	
									Black-capped Chickadee	2	100+	1P
									Blue Jay	1	100+	
									Canada Goose	4	100+	
									Common Raven	4	100+	
									Common Yellowthroat	1	100+	
									Dark-eyed Junco	2	100+	
									Golden-crowned Kinglet	1	100+	

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Individuals	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
									Killdeer	1	100+	
									Mallard	1	0-50	
									Northern Flicker	1	100+	
									Ovenbird	1	100+	
									Red-eyed Vireo	1	100+	
									Song Sparrow	4	100+	
									Swamp Sparrow	1	100+	
									White-throated Sparrow	2	100+	
									Yellow-bellied Flycatcher	2	100+	
	Kaiz007	402379 4952444	Young -mid-aged mix coniferous	10-20 km/h Sw	9	Clear	None	8:00 AM	Alder Flycatcher	2	100+	
									American Crow	2	100+	
									American Robin	2	100+	
									American Robin	6	100+	
									Black-and-white Warbler	2	100+	
									Black-capped Chickadee	2	100+	
									Blue Jay	1	100+	
									Blue Jay	2	100+	
									Blue-headed Vireo	1	100+	
									Chestnut-sided Warbler	1	100+	
									Common Yellowthroat	2	50-100	
									Hermit Thrush	1	50-100	
									Magnolia Warbler	1	100+	
									Nashville Warbler	1	100+	
									Northern Waterthrush	1	100+	
									Red-breasted Nuthatch	2	0-50	
									Red-eyed Vireo	2	100+	
									White-throated Sparrow	2	100+	
									White-throated Sparrow	4	100+	
									White-winged Crossbill	7	100+	
									Yellow Warbler	1	100+	
									Yellow-rumped Warbler	2	100+	
									Yellow-rumped Warbler	7	100+	
									Yellow-rumped Warbler	2	100+	
	Kaiz008	402144 4952321	Young -mid-aged mix coniferous	10-20 km/h Sw	9	Clear	None	8:20 AM	Alder Flycatcher	2	100+	
									American Crow	3	100+	
									American Robin	4	0-50	
									American Robin	2	50-100	
									American Robin	6	100+	
									Black-and-white Warbler	1	100+	
									Black-and-white Warbler	1	100+	
									Blue-headed Vireo	2	100+	
									Canada Warbler	1	100+	
									Cedar Waxwing	1	100+	
									Common Raven	2	100+	
									Dark-eyed Junco	2	100+	
									Hairy Woodpecker	1	100+	
									Hermit Thrush	2	100+	
									Palm Warbler	1	0-50	
									Palm Warbler	2	0-50	
									Red-eyed Vireo	2	0-50	
									Red-eyed Vireo	2	0-50	
									Red-eyed Vireo	1	100+	
									Swainson's Thrush	4	100+	
									Tennessee Warbler	1	100+	
									White-throated Sparrow	4	100+	

Table B4: Kaizer Meadow Wind Farm - Spring Migration Survey Results (pg 9) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Individuals	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
	Kaiz009	401972 4952491	Young -mid-aged mix coniferous	10-20 km/h Sw	9	Clear	None	8:40 AM	American Crow	2	100+	
									American Robin	4	0-50	
									American Robin	4	50-100	
									American Robin	7	100+	
									Black-and-white Warbler	1	100+	
									Black-capped Chickadee	2	100+	
									Black-throated Green Warbler	6	100+	
									Black-throated Green Warbler	2	100+	
									Blue Jay	2	100+	
									Blue Jay	4	100+	
									Dark-eyed Junco	2	100+	
									Northern Parula	1	100+	
									Ovenbird	1	100+	
									Pine Siskin	4	100+	
									Purple Finch	2	100+	
									Red-eyed Vireo	1	100+	
									Red-eyed Vireo	2	100+	
									Winter Wren	1	100+	
									Yellow-bellied Flycatcher	2	100+	
									Yellow-rumped Warbler	2	100+	
									Yellow-rumped Warbler	2	100+	
	Kaiz010	401834 4952798	Young -mid-aged mix coniferous	10-20 km/h Sw	9	Clear	None	8:55 AM	Alder Flycatcher	3	100+	
									American Robin	2	0-50	
									American Robin	6	0-50	
									American Robin	6	100+	
									Black-and-white Warbler	1	100+	
									Black-throated Green Warbler	4	100+	
									Blue Jay	2	100+	
									Blue-headed Vireo	1	100+	
									Blue-headed Vireo	1	100+	
									Common Yellowthroat	2	100+	
									Dark-eyed Junco	2	50-100	
									Dark-eyed Junco	1	100+	
									European Starling	4	100+	
									Hermit Thrush	2	50-100	
									Hermit Thrush	6	100+	
									Magnolia Warbler	2	100+	
									Magnolia Warbler	1	100+	
									Northern Flicker	1	100+	
									Northern Parula	1	100+	
									Purple Finch	2	100+	
									Red-eyed Vireo	4	100+	
									Red-eyed Vireo	2	100+	
									Swainson's Thrush	5	100+	
									Yellow Warbler	1	100+	
									Yellow-rumped Warbler	5	100+	
									Yellow-rumped Warbler	2	100+	
	Kaiz011	401619 4953158	Young -mid-aged mix coniferous- Black Spruce stand	10-20 km/h Sw	9	Clear	None	9:10 AM	American Crow	1	100+	
									American Goldfinch	2	100+	
									American Redstart	4	100+	
									American Robin	2	100+	
									American Robin	2	100+	
									American Robin	4	100+	
									Black-and-white Warbler	3	100+	
									Black-throated Green Warbler	2	100+	

Table B4: Kaizer Meadow Wind Farm - Spring Migration Survey Results (pg 10) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Individuals	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
									Black-throated Green Warbler	4	100+	
									Black-throated Green Warbler	1	100+	
									Blue Jay	2	100+	
									Blue-headed Vireo	2	100+	
									Blue-headed Vireo	1	100+	
									Chestnut-sided Warbler	2	100+	
									Common Raven	2	100+	
									Common Yellowthroat	4	0-50	
									Hermit Thrush	4	100+	
									Northern Parula	1	100+	
									Northern Parula	2	100+	
									Pileated Woodpecker	1	100+	
									Red-breasted Nuthatch	2	100+	
									Red-eyed Vireo	4	100+	
									Red-eyed Vireo	3	50-100	
									Ruby-crowned Kinglet	2	50-100	
									Ruby-crowned Kinglet	1	50-100	
									Ruby-crowned Kinglet	2	100+	
									Ruffed Grouse	1	100+	
									Song Sparrow	1	100+	
									Swainson's Thrush	2	100+	
									Swainson's Thrush	4	100+	
									Swainson's Thrush	4	100+	
									White-throated Sparrow	4	100+	
									Winter Wren	1	100+	
	Kaiz012	401320 4953257	Young -mid-aged mix coniferous- Black Spruce stand	10-20 km/h Sw	9	Clear	None	9:25 AM	Alder Flycatcher	1	100+	
									American Robin	4	100+	
									American Robin	8	100+	
									Black-throated Green Warbler	3	100+	
									Black-throated Green Warbler	2	100+	
									Black-throated Green Warbler	1	100+	
									Blue Jay	2	100+	
									Blue-headed Vireo	3	100+	
									Blue-headed Vireo	1	100+	
									Brown Creeper	1	100+	
									Cedar Waxwing	1	0-50	
									Chestnut-sided Warbler	1	0-50	
									Dark-eyed Junco	2	0-50	
									Dark-eyed Junco	4	100+	
									Gray jay	1	100+	
									Magnolia Warbler	4	100+	
									Magnolia Warbler	2	100+	
									Nashville Warbler	2	100+	
									Northern Waterthrush	1	50-100	
									Osprey	1	100+	
									Ovenbird	1	100+	
									Palm Warbler	2	100+	
									Palm Warbler	2	100+	
									Pine Siskin	2	100+	
									Red-eyed Vireo	2	100+	
									Red-eyed Vireo	2	100+	
									Red-eyed Vireo	2	100+	
									Ruby-crowned Kinglet	2	100+	
									Ruby-crowned Kinglet	1	100+	
									Swamp Sparrow	1	100+	
									Tennessee Warbler	1	100+	
									Yellow-rumped Warbler	4	100+	

Table B4: Kaizer Meadow Wind Farm - Spring Migration Survey Results (pg 11) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Individuals	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
	Kaiz013	401039 4953325	Young -mid-aged mix coniferous- Black Spruce stand	10-20 km/h Sw	9	Clear	None	9:40 AM	American Redstart	4	100+	
									American Robin	4	0-50	
									American Robin	2	50-100	
									American Robin	6	100+	
									Black-and-white Warbler	1	100+	
									Black-and-white Warbler	4	100+	
									Black-capped Chickadee	2	100+	
									Black-throated Green Warbler	8	100+	
									Black-throated Green Warbler	2	100+	
									Black-throated Green Warbler	2	100+	
									Blue-headed Vireo	4	100+	
									Blue-headed Vireo	1	100+	
									Cedar Waxwing	2	100+	
									Hermit Thrush	1	100+	
									Hermit Thrush	2	100+	
									Magnolia Warbler	6	100+	
									Northern Parula	3	100+	
									Northern Parula	1	100+	
									Northern Parula	1	100+	
									Red-eyed Vireo	5	100+	
									Red-eyed Vireo	2	100+	
									Red-eyed Vireo	2	100+	
									Ruby-crowned Kinglet	2	100+	
									Ruby-crowned Kinglet	4	100+	
									Swainson's Thrush	3	100+	
									Swainson's Thrush	2	100+	
									Swainson's Thrush	4	100+	
									White-throated Sparrow	4	0-50	
									White-throated Sparrow	4	0-50	
									Winter Wren	1	0-50	
									Yellow Warbler	5	0-50	
									Yellow Warbler	2	0-50	
	Kaiz014	400735 4953404	Young -mid-aged mix coniferous- Black Spruce stand	10-20 km/h Sw	9	Clear	None	10:00 AM	Alder Flycatcher	1	0-50	
									American Redstart	3	0-50	
									American Robin	2	0-50	
									American Robin	4	50-100	
									American Robin	6	100+	
									Black-and-white Warbler	2	100+	
									Black-throated Green Warbler	6	100+	
									Black-throated Green Warbler	4	100+	
									Black-throated Green Warbler	2	100+	
									Blue-headed Vireo	1	100+	
									Blue-headed Vireo	1	100+	
									Boreal Chickadee	2	100+	
									Brown Creeper	1	100+	
									Canada Warbler	1	100+	
									Common Yellowthroat	4	100+	
									Common Yellowthroat	3	100+	
									Hairy Woodpecker	1	100+	
									Magnolia Warbler	8	100+	
									Magnolia Warbler	2	100+	
									Nashville Warbler	4	100+	
									Red-eyed Vireo	4	100+	
									Red-eyed Vireo	1	100+	
									Red-eyed Vireo	2	100+	
									Ruby-crowned Kinglet	3	100+	
									Ruby-crowned Kinglet	2	100+	
									Song Sparrow	1	100+	
									Swainson's Thrush	2	100+	

Strum ENVIRONMENTAL

Table B4: Kaizer Meadow Wind Farm - Spring Migration Survey Results (pg 12) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Individuals	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
									Tennessee Warbler	1	100+	
									White-throated Sparrow	2	100+	
									White-throated Sparrow	2	100+	
									White-throated Sparrow	1	100+	
									Yellow Warbler	5	100+	

Table B5: Kaizer Meadow Wind Farm - Breeding Bird Survey Results *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
10-Jun-12	Kaiz001	0401795 4952978	Young -mid-aged mix coniferous	10 km/h NW	11	Overcast	None	4:02AM	American Crow	2	100+	
									American Robin	4	0-50	
									American Robin	6	50-100	
									American Robin	6	100+	
									Black-and-white Warbler	1	0-50	
									Black-and-white Warbler	1	50-100	
									Black-capped Chickadee	2	0-50	
									Black-throated Green Warbler	2	0-50	
									Black-throated Green Warbler	1	50-100	
									Black-throated Green Warbler	1	100+	
									Common Raven	4	100+	
									Dark-eyed Junco	1	0-50	
									Dark-eyed Junco	2	50-100	
									Dark-eyed Junco	1	100+	
									European Starling	9	0-50	
									Golden-crowned Kinglet	1	100+	
									Hermit Thrush	2	100+	
									Northern Parula	1	50-100	
									Ovenbird	1	100+	
									Palm Warbler	1	50-100	
									Pileated Woodpecker	1	50-100	
									Red-breasted Nuthatch	1	100+	
									Red-eyed Vireo	2	0-50	
									Red-eyed Vireo	1	50-100	
									Ruby-crowned Kinglet	1	0-50	
									Ruby-crowned Kinglet	1	100+	
									Song Sparrow	1	0-50	
									Song Sparrow	1	50-100	
									Winter Wren	1	100+	
									Yellow-rumped Warbler	2	0-50	
									Yellow-rumped Warbler	4	100+	
	Kaiz002	0402087 4953047	Young -mid-aged mix coniferous	10 km/h NW	11	Overcast	None	4:20 AM	American Crow	5	0-50	
									American Goldfinch	2	50-100	
									American Robin	4	0-50	
									American Robin	4	100+	
									Black-throated Green Warbler	4	50-100	
									Black-throated Green Warbler	1	100+	
									Common Raven	12	0-50	
									Common Raven	6	50-100	
									Common Raven	11	100+	
									Common Yellowthroat	2	50-100	
									Dark-eyed Junco	2	100+	
									Greater Black-backed Gull	6	0-50	
									Northern Parula	1	100+	
									Red-eyed Vireo	2	50-100	
									Red-eyed Vireo	1	100+	
									Song Sparrow	2	0-50	
									Song Sparrow	1	50-100	
									White-throated Sparrow	2	50-100	
									Yellow Warbler	2	0-50	
									Yellow Warbler	1	50-100	
									Yellow-rumped Warbler	2	50-100	
									Yellow-rumped Warbler	1	100+	

Table B5: Kaizer Meadow Wind Farm - Breeding Bird Survey Results (pg 2) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
	Kaiz003	402278 4953287	Young -mid-aged mix coniferous	10 km/h NW	11	Overcast	None	4:35 AM	Alder Flycatcher	2	50-100	
									American Goldfinch	2	0-50	
									American Redstart	1	0-50	
									American Robin	3	0-50	
									American Robin	4	100+	
									Black-and-white Warbler	1	0-50	
									Blue Jay	2	50-100	
									Chestnut-sided Warbler	1	0-50	
									Chestnut-sided Warbler	1	50-100	
									Common Raven	6	100+	
									Common Yellowthroat	1	0-50	
									Dark-eyed Junco	2	0-50	
									Eastern-wood Pewee	1	100+	
									Magnolia Warbler	2	0-50	
									Nashville Warbler	1	0-50	
									Song Sparrow	1	0-50	
									Song Sparrow	1	50-100	
									White-throated Sparrow	2	0-50	
									Winter Wren	1	100+	
									Yellow Warbler	1	0-50	
									Yellow-rumped Warbler	1	0-50	
									Yellow-rumped Warbler	2	100+	
	Kaiz004	402445 4953108	Grassy field	10 km/h NW	11	Overcast	None	4:55 AM	American Crow	27	0-50	
									American Robin	4	50-100	
									Bald Eagle	1	100+	
									Common Raven	41	0-50	
									Common Raven	6	100+	
									European Starling	27	0-50	
									Greater Black-backed Gull	28	0-50	
									Hermit Thrush	1	100+	
									Herring Gull	16	0-50	
									Ring-billed Gull	4	0-50	
									Song Sparrow	2	50-100	
	Kaiz005	402292 4952916	Center of landfill dumping area	10 km/h NW	11	Overcast	None	5:10 AM	American Goldfinch	2	50-100	1P
									American Redstart	1	50-100	
									American Robin	6	0-50	
									American Robin	2	50-100	
									American Robin	7	100+	
									Black-throated Green Warbler	2	100+	
									Common Yellowthroat	1	50-100	
									Hermit Thrush	2	100+	
									Killdeer	1	50-100	
									Northern Parula	1	100+	
									Ovenbird	1	100+	
									Ruby-crowned Kinglet	2	100+	
									Savanaha Sparrow	2	0-50	
									Song Sparrow	4	0-50	
									Song Sparrow	1	50-100	
									Swainson's Thrush	4	100+	
									Swamp Sparrow	1	50-100	
									Tree Swallow	2	50-100	1P
									White-throated Sparrow	1	50-100	
									Winter Wren	1	100+	
									Yellow Warbler	1	50-100	
									Yellow Warbler	2	100+	

Table B5: Kaizer Meadow Wind Farm - Breeding Bird Survey Results (pg 3) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
	Kaiz006	402414 4952691	Sewage Lagoons	10 km/h NW	11	Overcast	None	5:25 AM	American Black Duck	10	0-50	Adult + 9 Young
									American Robin	1	0-50	
									American Robin	4	50-100	
									American Robin	2	100+	
									Black-throated Green Warbler	1	100+	
									Canada Goose	2	0-50	1P
									Common Raven	4	100+	
									Common Yellowthroat	2	0-50	
									Common Yellowthroat	1	50-100	
									Common Yellowthroat	2	100+	
									Hermit Thrush	2	100+	
									Killdeer	1	0-50	
									Nashville Warbler	1	100+	
									Northern Flicker	1	50-100	
									Pine Siskin	2	100+	
									Red-breasted Nuthatch	1	100+	
									Red-eyed Vireo	2	100+	
									Savanaha Sparrow	1	50-100	
									Song Sparrow	2	0-50	
									Song Sparrow	2	50-100	
									Swamp Sparrow	1	50-100	
									Tree Swallow	1	0-50	
									White-throated Sparrow	1	50-100	
									White-throated Sparrow	1	100+	
									Yellow-rumped Warbler	1	100+	
	Kaiz007	402379 4952444	Young -mid-aged mix coniferous	10 km/h NW	11	Overcast	None	5:45 AM	Alder Flycatcher	2	50-100	
									American Crow	2	100+	
									American Redstart	2	0-50	
									American Robin	2	0-50	
									American Robin	4	50-100	
									American Robin	5	100+	
									Black-and-white Warbler	1	50-100	
									Black-capped Chickadee	2	0-50	1P
									Black-capped Chickadee	2	50-100	1P
									Black-throated Green Warbler	2	0-50	
									Black-throated Green Warbler	2	100+	
									Blue-headed Vireo	1	0-50	
									Blue-headed Vireo	1	50-100	
									Brown Creeper	1	0-50	
									Canada Warbler	1	0-50	
									Common Grackle	2	50-100	
									Common Raven	2	100+	
									Common Yellowthroat	2	0-50	1P
									Common Yellowthroat	2	50-100	
									Downy Woodpecker	1	50-100	
									Eastern-wood Pewee	1	100+	
									Hermit Thrush	1	0-50	
									Hermit Thrush	1	50-100	
									Hermit Thrush	2	100+	
									Magnolia Warbler	1	0-50	
									Magnolia Warbler	2	50-100	
									Magnolia Warbler	4	100+	
									Nashville Warbler	2	0-50	
									Northern Parula	1	50-100	
									Northern Parula	1	100+	
									Pine Siskin	5	50-100	
									Red-eyed Vireo	2	0-50	
									Red-eyed Vireo	1	50-100	
									Red-eyed Vireo	2	100+	
									Song Sparrow	1	0-50	
									Swainson's Thrush	2	50-100	

Table B5: Kaizer Meadow Wind Farm - Breeding Bird Survey Results (pg 4) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
									Swainson's Thrush	1	100+	
									Tennessee Warbler	1	50-100	
									White-throated Sparrow	2	0-50	
									Yellow Warbler	2	0-50	
									Yellow-rumped Warbler	1	0-50	
									Yellow-rumped Warbler	2	50-100	
									Yellow-rumped Warbler	2	100+	
	Kaiz008	402144 4952321	Young -mid-aged mix coniferous	10 km/h NW	11	Overcast	None	6:00 AM	Alder Flycatcher	1	50-100	
									American Goldfinch	2	50-100	
									American Robin	2	0-50	
									American Robin	4	50-100	
									American Robin	6	100+	
									Black-and-white Warbler	1	0-50	
									Black-and-white Warbler	1	50-100	
									Black-capped Chickadee	2	0-50	1P
									Black-throated Green Warbler	2	0-50	
									Black-throated Green Warbler	2	100+	
									Common Yellowthroat	2	0-50	
									Dark-eyed Junco	2	0-50	
									Dark-eyed Junco	2	100+	
									Gray Jay	1	100+	
									Hairy Woodpecker	2	0-50	
									Magnolia Warbler	2	0-50	
									Magnolia Warbler	2	50-100	
									Magnolia Warbler	3	100+	
									Northern Flicker	1	100+	
									Ovenbird	1	100+	
									Palm Warbler	1	50-100	
									Palm Warbler	1	100+	
									Red-breasted Nuthatch	2	100+	
									Ruby-crowned Kinglet	2	0-50	
									Ruby-crowned Kinglet	1	50-100	
									Ruby-crowned Kinglet	2	100+	
									Song Sparrow	1	0-50	
									White-throated Sparrow	4	0-50	2P
									Winter Wren	1	100+	
									Yellow-rumped Warbler	1	0-50	
									Yellow-rumped Warbler	1	50-100	
									Yellow-rumped Warbler	2	100+	
	Kaiz009	401972 4952491	Young -mid-aged mix coniferous	10 km/h NW	11	Overcast	None	6:15 AM	American Robin	4	0-50	
									American Robin	2	50-100	
									American Robin	5	100+	
									Black-and-white Warbler	1	0-50	
									Black-and-white Warbler	1	50-100	
									Black-throated Green Warbler	2	0-50	
									Black-throated Green Warbler	1	50-100	
									Black-throated Green Warbler	2	100+	
									Blue Jay	2	50-100	
									Blue-headed Vireo	1	0-50	
									Blue-headed Vireo	1	50-100	
									Chestnut-sided Warbler	1	0-50	
									Common Yellowthroat	1	0-50	
									Dark-eyed Junco	1	0-50	
									Dark-eyed Junco	2	100+	
									Hairy Woodpecker	1	0-50	
									Hermit Thrush	2	50-100	
									Hermit Thrush	4	100+	
									Lincoln's Sparrow	1	100+	
									Magnolia Warbler	3	0-50	
									Magnolia Warbler	2	50-100	
									Magnolia Warbler	4	100+	
									Nashville Warbler	1	0-50	

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Table B5: Kaizer Meadow Wind Farm - Breeding Bird Survey Results (pg 5) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
									Northern Flicker	1	100+	
									Northern Parula	1	100+	
									Ovenbird	1	100+	
									Purple Finch	1	50-100	
									Purple Finch	1	100+	
									Red-eyed Vireo	2	0-50	
									Red-eyed Vireo	3	50-100	
									Red-eyed Vireo	4	100+	
									Ruby-crowned Kinglet	1	0-50	
									Ruby-crowned Kinglet	1	100+	
									Swainson's Thrush	1	50-100	
									Swainson's Thrush	1	100+	
									White-throated Sparrow	2	0-50	1P
									White-throated Sparrow	1	50-100	
									White-winged Crossbill	6	50-100	
									Winter Wren	1	50-100	
									Yelllow-bellied Flycatcher	2	100+	
									Yellow-rumped Warbler	1	0-50	
									Yellow-rumped Warbler	2	50-100	
									Yellow-rumped Warbler	2	100+	
	Kaiz010	401834 4952798	Young -mid-aged mix coniferous	10 km/h NW	11	Overcast	None	6:30 AM	American Goldfinch	2	0-50	
									American Robin	3	0-50	1P
									American Robin	4	50-100	
									American Robin	5	100+	
									Black-and-white Warbler	1	50-100	
									Black-capped Chickadee	2	0-50	
									Blue-headed Vireo	1	100+	
									Boreal Chickadee	2	0-50	
									Common Grackle	2	0-50	1P
									Common Raven	4	100+	
									Dark-eyed Junco	2	0-50	
									European Starling	14	0-50	
									Golden-crowned Kinglet	2	100+	
									Hairy Woodpecker	1	50-100	
									Hermit Thrush	1	0-50	
									Hermit Thrush	2	100+	
									Magnolia Warbler	1	0-50	
									Magnolia Warbler	2	100+	
									Mourning Dove	3	0-50	
									Northern Goshawk	1	50-100	
									Pine Siskin	6	0-50	
									Red-breasted Nuthatch	2	100+	
									Red-eyed Vireo	2	50-100	
									Red-eyed Vireo	2	100+	
									Ruby-crowned Kinglet	1	0-50	
									Ruby-throated Hummingbird	1	0-50	
									Song Sparrow	1	0-50	
									Swainson's Thrush	1	100+	
									Tree Swallow	1	0-50	
									Winter Wren	1	100+	
									Yellow Warbler	1	0-50	
									Yellow Warbler	1	50-100	
									Yellow-bellied Flycatcher	1	100+	
									Yellow-rumped Warbler	1	0-50	

Table B5: Kaizer Meadow Wind Farm - Breeding Bird Survey Results (pg 6) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
	Kaiz011	401619 4953158	Young -mid-aged mix coniferous-Black Spruce stand	10 km/h NW	11	Overcast	None	6:50 AM	American Crow	1	100+	
									American Goldfinch	2	100+	
									American Robin	2	0-50	
									American Robin	4	50-100	
									American Robin	7	100+	
									Black-capped Chickadee	1	50-100	
									Black-throated Green Warbler	2	0-50	1P
									Black-throated Green Warbler	2	50-100	
									Black-throated Green Warbler	4	100+	
									Blue-headed Vireo	1	0-50	
									Blue-headed Vireo	1	100+	
									Boreal Chickadee	2	0-50	1P
									Chestnut-sided Warbler	1	0-50	
									Common Raven	2	100+	
									Common Yellowthroat	2	0-50	1P
									Common Yellowthroat	1	0-50	
									Downy Woodpecker	1	0-50	
									Gray Catbird	1	0-50	
									Hermit Thrush	6	100+	
									Magnolia Warbler	2	0-50	
									Magnolia Warbler	2	50-100	
									Magnolia Warbler	4	100+	
									Mourning Dove	1	100+	
									Northern Parula	1	100+	
									Palm Warbler	1	100+	
									Purple Finch	2	50-100	
									Red-breasted Nuthatch	1	50-100	
									Red-eyed Vireo	1	0-50	
									Red-eyed Vireo	2	50-100	
									Red-eyed Vireo	4	100+	
									Ruffed Grouse	1	50-100	
									Swainson's Thrush	1	0-50	
									Swainson's Thrush	2	50-100	
									Swainson's Thrush	4	100+	
									White-throated Sparrow	4	0-50	2P
									White-throated Sparrow	1	50-100	
									Yellow-rumped Warbler	2	50-100	
									Yellow-rumped Warbler	1	100+	
	Kaiz012	401320 4953257	Young -mid-aged mix coniferous-Black Spruce stand	10 km/h NW	11	Overcast	None	7:05 AM	American Crow	2	100+	
									American Goldfinch	2	0-50	1P
									Black-and-white Warbler	1	0-50	
									Black-and-white Warbler	1	50-100	
									Black-throated Green Warbler	2	0-50	
									Black-throated Green Warbler	2	50-100	
									Black-throated Green Warbler	1	100+	
									Blue Jay	1	0-50	
									Canada Warbler	1	0-50	
									Common Raven	1	100+	
									Common Yellowthroat	2	0-50	1P
									Common Yellowthroat	2	50-100	
									Common Yellowthroat	2	100+	
									Dark-eyed Junco	2	0-50	1P
									Dark-eyed Junco	1	100+	
									Hermit Thrush	2	50-100	
									Hermit Thrush	3	100+	
									Magnolia Warbler	2	50-100	
									Magnolia Warbler	4	100+	
									Nashville Warbler	2	0-50	
									Northern Waterthrush	1	100+	
									Ovenbird	1	0-50	
									Palm Warbler	1	100+	
									Purple Finch	1	0-50	

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
									Purple Finch	2	50-100	
									Red-breasted Nuthatch	1	50-100	
									Ruby-crowned Kinglet	2	0-50	
									Ruby-crowned Kinglet	2	100+	
									Ruffed Grouse	1	100+	
									Swainson's Thrush	2	0-50	
									Swainson's Thrush	1	50-100	
									White-throated Sparrow	4	0-50	2P
									White-throated Sparrow	1	50-100	
									White-throated Sparrow	1	100+	
									Yellow Warbler	2	0-50	
									Yellow Warbler	1	100+	
	Kaiz013	401039 4953325	Young -mid-aged mix coniferous-Black Spruce stand	10 km/h NW	11	Overcast	None	7:20 AM	American Redstart	1	0-50	
									American Redstart	1	50-100	
									American Robin	2	0-50	
									American Robin	2	50-100	
									American Robin	6	100+	
									Black-and-white Warbler	2	0-50	
									Black-and-white Warbler	1	50-100	
									Black-capped Chickadee	1	50-100	
									Black-throated Green Warbler	2	0-50	1P
									Black-throated Green Warbler	2	50-100	
									Black-throated Green Warbler	3	100+	
									Blue Jay	2	100+	
									Blue-headed Vireo	1	0-50	
									Blue-headed Vireo	2	50-100	
									Canada Warbler	1	50-100	
									Common Grackle	2	100+	
									Common Yellowthroat	2	0-50	
									Common Yellowthroat	1	50-100	
									Dark-eyed Junco	1	0-50	
									Dark-eyed Junco	2	50-100	
									Dark-eyed Junco	1	100+	
									Hermit Thrush	2	100+	
									Magnolia Warbler	2	0-50	
									Magnolia Warbler	3	50-100	
									Magnolia Warbler	3	100+	
									Northern Flicker	1	100+	
									Northern Parula	1	0-50	
									Northern Parula	1	100+	
									Ovenbird	1	100+	
									Red-breasted Nuthatch	2	100+	
									Red-eyed Vireo	1	0-50	
									Red-eyed Vireo	2	50-100	
									Red-eyed Vireo	3	100+	
									Ruby-crowned Kinglet	2	0-50	1P
									Ruby-crowned Kinglet	1	50-100	
									Ruby-crowned Kinglet	2	100+	
									Ruffed Grouse	1	100+	
									Swainson's Thrush	1	0-50	
									Swainson's Thrush	1	50-100	
									Swainson's Thrush	1	100+	
									Tennessee Warbler	1	50-100	
									White-throated Sparrow	1	0-50	
									White-throated Sparrow	2	50-100	
									Yellow Warbler	1	50-100	
									Yellow Warbler	1	100+	
									Yellow-rumped Warbler	1	0-50	
									Yellow-rumped Warbler	2	100+	

Table B5: Kaizer Meadow Wind Farm - Breeding Bird Survey Results (pg 8) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
	Kaiz014	400735 4953404	Young -mid-aged mix coniferous-Black Spruce stand	10 km/h NW	11	Overcast	None	7:40 AM	Dark-eyed Junco	2	0-50	1P
									Black-capped Chickadee	2	0-50	1P
									American Robin	2	0-50	
									Pine Siskin	2	0-50	
									Yellow-rumped Warbler	1	0-50	
									Common Yellowthroat	2	0-50	
									Yellow Warbler	1	0-50	
									Canada Warbler	1	0-50	
									White-throated Sparrow	2	0-50	
									Red-breasted Nuthatch	1	0-50	
									Ruby-crowned Kinglet	1	0-50	
									Black-throated Green Warbler	2	0-50	
									American Redstart	1	0-50	
									Chestnut-sided Warbler	1	0-50	
									Black-and-white Warbler	1	0-50	
									Magnolia Warbler	2	0-50	
									Nashville Warbler	2	0-50	
									American Robin	4	50-100	
									Palm Warbler	1	50-100	
									Hermit Thrush	2	50-100	
									Swainson's Thrush	1	50-100	
									Yellow-bellied Flycatcher	1	50-100	
									Blue Jay	2	50-100	
									Yellow-rumped Warbler	2	50-100	
									Dark-eyed Junco	1	50-100	
									Common Yellowthroat	1	50-100	
									American Goldfinch	2	50-100	
									White-throated Sparrow	4	50-100	
									Black-capped Chickadee	1	50-100	
									Ruby-crowned Kinglet	1	50-100	
									Black-throated Green Warbler	2	50-100	
									Magnolia Warbler	1	50-100	
									American Robin	4	100+	
									Swainson's Thrush	1	100+	
									Hermit Thrush	1	100+	
									Yellow-rumped Warbler	1	100+	
									Red-breasted Nuthatch	1	100+	
									Common Raven	4	100+	
									American Crow	2	100+	
									White-throated Sparrow	1	100+	
									Winter Wren	1	100+	
									Ruby-crowned Kinglet	1	100+	
									Black-throated Green Warbler	2	100+	
									Magnolia Warbler	3	100+	
									Northern Flicker	1	100+	
									Chipping Sparrow	1	100+	
17-Jun-12	Kaiz001	0401795 4952978	Young -mid-aged mix coniferous	Calm	7	Clear	None	4:43 AM	Alder Flycatcher	1	50-100	
									American Robin	5	0-50	
									American Robin	7	50-100	
									American Robin	11	100+	
									Black-capped Chickadee	2	50-100	
									Black-throated Green Warbler	1	100+	
									Common Raven	1	100+	
									Dark-eyed Junco	1	0-50	
									Dark-eyed Junco	2	100+	
									Hermit Thrush	3	50-100	
									Hermit Thrush	5	100+	
									Mourning Dove	2	50-100	
									Red-eyed Vireo	1	0-50	
									Red-eyed Vireo	2	50-100	
									Red-eyed Vireo	4	100+	

Table B5: Kaizer Meadow Wind Farm - Breeding Bird Survey Results (pg 9) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
									Song Sparrow	1	0-50	
									Song Sparrow	1	50-100	
									Swainson's Thrush	4	0-50	
									Swainson's Thrush	2	100+	
									Yellow-rumped Warbler	1	100+	
	Kaiz002	0402087 4953047	Young -mid-aged mix coniferous	Calm	7	Clear	None	4:58 AM	Alder Flycatcher	2	50-100	
									American Crow	4	0-50	
									American Crow	4	50-100	
									American Crow	2	100+	
									American Robin	7	0-50	
									American Robin	8	50-100	
									American Robin	9	100+	
									Black-capped Chickadee	1	50-100	
									Common Raven	4	0-50	Family
									Common Raven	7	100+	
									Common Yellowthroat	1	50-100	
									Dark-eyed Junco	1	0-50	
									Dark-eyed Junco	1	50-100	
									Mourning Dove	1	100+	
									Purple Finch	1	0-50	
									Song Sparrow	1	0-50	
									Song Sparrow	1	50-100	
									Swainson's Thrush	1	0-50	
									Swainson's Thrush	4	50-100	
	Kaiz003	402278 4953287	Young -mid-aged mix coniferous	Calm	7	Clear	None	5:14 AM	Alder Flycatcher	2	0-50	
									American Crow	4	100+	
									American Goldfinch	2	0-50	1P
									Black-capped Chickadee	1	50-100	
									Black-throated Blue Warbler	1	50-100	
									Cedar Waxwing	2	0-50	1P
									Common Raven	7	FO S	
									Common Raven	1	FO W	
									Common Raven	8	100+	
									Common Yellowthroat	1	0-50	
									Dark-eyed Junco	1	100+	
									Magnolia Warbler	1	0-50	
									Purple Finch	1	100+	
									Red-eyed Vireo	1	0-50	
									Song Sparrow	2	50-100	
									Swainson's Thrush	3	0-50	
	Kaiz005	402292 4952916	Center of landfill dumping area	Calm	7	Clear	None	5:34 AM	American Crow	12	0-50	
									American Crow	22	50-100	
									American Robin	14	100+	
									Bald Eagle	1	50-100	
									Common Raven	83	0-50	
									Common Yellowthroat	2	50-100	
									Downy Woodpecker	1	50-100	
									European Starling	8	50-100	
									Mourning Dove	2	50-100	
									Pine Siskin	2	50-100	
									Savannah Sparrow	2	0-50	
									Savannah Sparrow	2	50-100	
									Song Sparrow	4	0-50	
									Song Sparrow	5	50-100	
									Swainson's Thrush	3	50-100	
									Tree Swallow	2	0-50	1P
									Yellow Warbler	1	50-100	

Table B5: Kaizer Meadow Wind Farm - Breeding Bird Survey Results (pg 10) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
	Kaiz006	402414 4952691	Sewage Lagoons	Calm	7	Clear	None	5:50 AM	Canada Goose	1	0-50	
									Common Merganser	1	0-50	
									Spotted Sandpiper	1	0-50	
									Tree Swallow	2	0-50	1P
	Kaiz007	402379 4952444	Young -mid-aged mix coniferous	Calm	7	Clear	None	5:54 AM	Alder Flycatcher	3	0-50	
									American Crow	4	0-50	
									American Crow	10	100+	
									American Crow	10	100+	
									American Robin	6	0-50	
									American Robin	4	50-100	
									American Robin	9	100+	
									American Robin	4	0-50	
									American Robin	2	50-100	
									American Robin	4	100+	
									Black-thorated Blue Warbler	1	0-50	
									Black-throated Blue Warbler	1	100+	
									Blue Jay	2	0-50	
									Blue Jay	1	0-50	
									Blue-headed Vireo	1	0-50	
									Cedar Waxwing	2	0-50	1P
									Common Grackle	1	0-50	
									Common Raven	15	100+	
									Common Raven	20	100+	
									Common Yellowthroat	2	0-50	
									Dark-eyed Junco	1	0-50	
									Dark-eyed Junco	2	100+	
									Dark-eyed Junco	2	0-50	
									European Starling	4	50-100	
									Golden-crowned Kinglet	4	0-50	Family
									Gray Catbird	1	0-50	
									Hairy Woodpecker	1	0-50	
									Hermit Thrush	2	0-50	1P
									Hermit Thrush	4	0-50	
	Kaiz008	402144 4952321	Young -mid-aged mix coniferous	Calm	9	Clear	None	6:10 AM	Hermit Thrush	3	50-100	
									Magnolia Warbler	1	0-50	
									Magnolia Warbler	1	50-100	
									Magnolia Warbler	4	0-50	
									Magnolia Warbler	2	50-100	
									Magnolia Warbler	2	100+	
									Mourning Dove	2	50-100	
									Mourning Dove	1	50-100	
									Northern Parula	1	50-100	
									Northern Flicker	1	100+	
									Northern Flicker	1	100+	
									Northern Parula	1	0-50	
									Northern Parula	1	100+	
									Ovenbird	1	0-50	
									Pileated Woodpecker	1	100+	
									Pine Siskin	2	0-50	1P
									Red-eyed Vireo	2	50-100	
									Red-eyed Vireo	4	100+	
									Ruby-crowned Kinglet	2	0-50	
									Song Sparrow	2	0-50	1P
									Song Sparrow	2	50-100	
									Swainson's Thrush	4	0-50	
									Swainson's Thrush	4	50-100	
									Swainson's Thrush	2	100+	
									Swainson's Thrush	2	0-50	
									Swainson's Thrush	2	50-100	
									Veery	1	100+	
									Veery	1	100+	
									White-throated Sparrow	1	100+	

Table B5: Kaizer Meadow Wind Farm - Breeding Bird Survey Results (pg 11) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
	Kaiz009	401972 4952491	Young -mid-aged mix coniferous	Calm	10	Clear	None	6:27 AM	American Crow	5	100+	
									American Goldfinch	2	0-50	1P
									Black-throated Green Warbler	2	0-50	
									Black-throated Green Warbler	1	50-100	
									Common Raven	20	100+	
									Common Raven	4	0-50	
									Common Yellowthroat	2	0-50	1P
									Dark-eyed Junco	2	0-50	
									Dark-eyed Junco	1	50-100	
									Dark-eyed Junco	1	100+	
									European Starling	7	100+	
									Mourning Dove	1	0-50	
									Mourning Dove	1	50-100	
									Northern Parula	2	0-50	
									Red-breasted Nuthatch	1	0-50	
									Red-eyed Vireo	1	0-50	
									Red-eyed Vireo	1	50-100	
									Swainson's Thrush	2	0-50	
									Swainson's Thrush	1	50-100	
									Yellow-rumped Warbler	1	0-50	
	Kaiz010	401834 4952798	Young -mid-aged mix coniferous	Calm	10	Clear	None	6:42 AM	American Crow	5	100+	
									American Goldfinch	2	0-50	1P
									American Redstart	1	0-50	
									American Robin	5	0-50	
									American Robin	3	50-100	
									American Robin	7	100+	
									Black-capped Chickadee	2	0-50	1P
									Black-capped Chickadee	1	50-100	
									Black-throated Green Warbler	2	0-50	
									Blue Jay	1	0-50	
									Blue-headed Vireo	1	50-100	
									Common Raven	6	FO N	
									Common Raven	30	100+	
									Dark-eyed Junco	2	0-50	
									Dark-eyed Junco	1	100+	
									European Starling	1	FO S	
									Hermit Thrush	1	50-100	
									Hermit Thrush	2	100+	
									Magnolia Warbler	2	0-50	
									Magnolia Warbler	1	50-100	
									Magnolia Warbler	3	100+	
									Mourning Dove	1	50-100	
									Ovenbird	2	0-50	
									Ovenbird	1	100+	
									Pine Siskin	2	0-50	1P
									Red-eyed Vireo	1	0-50	
									Red-eyed Vireo	1	50-100	
									Tree Swallow	1	FO N	
									White-winged Crossbill	2	100+	
	Kaiz011	401619 4953158	Young -mid-aged mix coniferous-Black Spruce stand	Calm	11	Clear	None	7:01 AM	American Crow	1	100+	
									American Goldfinch	2	0-50	1P
									American Robin	2	0-50	
									American Robin	4	50-100	
									American Robin	4	100+	
									Black-and-white Warbler	1	0-50	
									Black-capped Chickadee	4	0-50	2P
									Cedar Waxwing	1	50-100	
									Common Raven	1	FO E	
									Common Raven	1	FO S	
									Common Raven	10	100+	
									Dark-eyed Junco	2	0-50	1P

Table B5: Kaizer Meadow Wind Farm - Breeding Bird Survey Results (pg 12) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
									Dark-eyed Junco	1	0-50	
									Dark-eyed Junco	1	50-100	
									Hermit Thrush	1	0-50	
									Magnolia Warbler	1	0-50	
									Magnolia Warbler	1	50-100	
									Nashville Warbler	1	0-50	
									Northern Parula	2	0-50	
									Ovenbird	1	0-50	
									Red-eyed Vireo	1	50-100	
									Ruby-crowned Kinglet	1	50-100	
									Yellow Warbler	1	0-50	
									White-throated Sparrow	1	0-50	
	Kaiz012	401320 4953257	Young -mid-aged mix coniferous-Black Spruce stand	Calm	11	Clear	None	7:16 AM	American Robin	1	0-50	
									American Robin	1	100+	
									Black-capped Chickadee	2	0-50	1P
									Black-throated Green Warbler	1	0-50	
									Black-throated Green Warbler	1	100+	
									Brown Creeper	1	0-50	
									Cedar Waxwing	2	0-50	1P
									Common Raven	10	100+	
									Dark-eyed Junco	1	0-50	
									Dark-eyed Junco	1	50-100	
									Hermit Thrush	1	0-50	
									Hermit Thrush	2	100+	
									Mourning Dove	1	50-100	
									Ovenbird	1	50-100	
									Red-eyed Vireo	1	0-50	
	Kaiz013	401039 4953325	Young -mid-aged mix coniferous-Black Spruce stand	Calm	11	Clear	None	7:31 AM	American Crow	1	100+	
									American Robin	1	0-50	
									American Robin	1	50-100	
									American Robin	2	100+	
									Black-throated Green Warbler	1	0-50	
									Black-throated Green Warbler	1	50-100	
									Common Raven	5	100+	
									Golden-crowned Kinglet	4	0-50	Family
									Hermit Thrush	1	0-50	
									Magnolia Warbler	1	0-50	
									Mourning Dove	1	0-50	
									Northern Flicker	1	100+	
									Ovenbird	1	0-50	
									Ovenbird	1	100+	
									Red-breasted Nuthatch	1	100+	
									Red-eyed Vireo	1	0-50	
									Red-eyed Vireo	1	100+	
									Ruby-throated Hummingbird	1	0-50	
									White-throated Sparrow	1	0-50	
									White-throated Sparrow	1	50-100	
	Kaiz014	400735 4953404	Young -mid-aged mix coniferous-Black Spruce stand	Calm	11	Clear	None	7:47 AM	Black-capped Chickadee	1	0-50	
									Common Raven	1	FO E	
									Common Raven	4	100+	
									Common Yellowthroat	1	0-50	
									Dark-eyed Junco	1	0-50	
									Dark-eyed Junco	1	100+	
									Hermit Thrush	1	0-50	
									Hermit Thrush	2	50-100	
									Hermit Thrush	1	100+	
									Mourning Dove	1	0-50	
									Ovenbird	3	0-50	
									White-throated Sparrow	1	0-50	
									White-throated Sparrow	1	100+	

Table B5: Kaizer Meadow Wind Farm - Breeding Bird Survey Results (pg 13) *Project # 12-4360*

Date	Location	Coordinates (UTM NAD83)	Habitat	Conditions				Time	Common Name	Number Observed	Distance (m)	Pairs
				Wind	Temperature	Sky	Precipitation					
	Kaiz015	400479 4953172	Young -mid-aged mix coniferous-Black Spruce stand	15 km/h E	12	Clear	None	8:02 AM	American Crow	1	100+	
									American Goldfinch	1	0-50	
									American Robin	2	0-50	
									American Robin	2	50-100	
									American Robin	3	100+	
									Black-and-white Warbler	1	0-50	
									Black-throated Green Warbler	1	0-50	
									Black-throated Green Warbler	1	50-100	
									Cedar Waxwing	1	0-50	
									Common Raven	1	100+	
									Dark-eyed Junco	1	0-50	
									Dark-eyed Junco	2	50-100	
									Golden-crowned Kinglet	2	0-50	1P
									Hermit Thrush	1	0-50	
									Hermit Thrush	2	50-100	
									Hermit Thrush	2	100+	
									Magnolia Warbler	2	0-50	
									Magnolia Warbler	1	50-100	
									Nashville Warbler	1	50-100	
									Palm Warbler	1	0-50	
									Purple Finch	1	0-50	
									Red-breasted Nuthatch	2	50-100	
									White-throated Sparrow	1	0-50	
	Kaiz91	0399959 4953235	Young -mid-aged mix coniferous-Black Spruce stand	15 km/h E	12	Clear	None	8:32 AM	American Goldfinch	2	0-50	1P
									American Robin	3	0-50	
									American Robin	1	50-100	
									American Robin	2	100+	
									Blackburnian Warbler	1	0-50	
									Black-capped Chickadee	2	0-50	1P
									Black-throated Green Warbler	1	0-50	
									Black-throated Green Warbler	1	100+	
									Blue Jay	1	50-100	
									Blue-headed Vireo	1	0-50	
									Common Raven	1	100+	
									Dark-eyed Junco	2	0-50	
									Evening Grosbeak	1	0-50	
									Hermit Thrush	2	0-50	
									Hermit Thrush	2	50-100	
									Magnolia Warbler	2	0-50	
									Magnolia Warbler	3	50-100	
									Magnolia Warbler	2	100+	
									Mourning Dove	1	0-50	
									Northern Parula	1	50-100	
									Ovenbird	1	0-50	
									Ovenbird	1	50-100	
									Red-eyed Vireo	1	50-100	
									Red-eyed Vireo	1	100+	
									Ruby-crowned Kinglet	1	0-50	
									Ruby-crowned Kinglet	1	100+	
									Tennessee Warbler	1	0-50	
									Veery	1	100+	
									White-throated Sparrow	1	0-50	

Table B6: Kaizer Meadow Wind Farm - Breeding Bird Survey Results - Probable Breeding Species ***Project # 12-4360***

Common Name	Scientific Name	NSDNR Status	COSEWIC Status	SARA Status	NSESA Status	Breeding Evidence
Alder Flycatcher	*Empidonax alnorum*	Green	Not Listed	Not Listed	Not Listed	T
American Black Duck	*Anas rubripes*	Green	Not Listed	Not Listed	Not Listed	P
American Crow	*Corvus brachyrhynchos*	Green	Not Listed	Not Listed	Not Listed	T
American Goldfinch	*Spinus tristis*	Green	Not Listed	Not Listed	Not Listed	P
Black-capped Chickadee	*Poecile atricapillus*	Green	Not Listed	Not Listed	Not Listed	P
Black-throated Green Warbler	*Dendroica virens*	Green	Not Listed	Not Listed	Not Listed	P
Blue-headed Vireo	*Vireo solitarius*	Green	Not Listed	Not Listed	Not Listed	T
Boreal Chickadee	*Poecile hudsonicus*	Yellow	Not Listed	Not Listed	Not Listed	P
Canada Goose	*Branta canadensis*	Green	Not Listed	Not Listed	Not Listed	P
Cedar Waxwing	*Bombycilla cedrorum*	Green	Not Listed	Not Listed	Not Listed	P
Common Grackle	*Quiscalus quiscula*	Green	Not Listed	Not Listed	Not Listed	P
Common Raven	*Corvus corax*	Green	Not Listed	Not Listed	Not Listed	P
Common Yellowthroat	*Geothlypis trichas*	Green	Not Listed	Not Listed	Not Listed	P
Dark-eyed Junco	*Junco hyemalis*	Green	Not Listed	Not Listed	Not Listed	P
Golden-crowned Kinglet	*Regulus satrapa*	Yellow	Not Listed	Not Listed	Not Listed	P
Hermit Thrush	*Catharus guttatus*	Green	Not Listed	Not Listed	Not Listed	P
Magnolia Warbler	*Dendroica magnolia*	Green	Not Listed	Not Listed	Not Listed	T
Northern Flicker	*Colaptes auratus*	Green	Not Listed	Not Listed	Not Listed	T
Northern Parula	*Parula americana*	Green	Not Listed	Not Listed	Not Listed	T
Ovenbird	*Seiurus aurocapilla*	Green	Not Listed	Not Listed	Not Listed	T
Pine Siskin	*Spinus pinus*	Yellow	Not Listed	Not Listed	Not Listed	P
Red-eyed Vireo	*Vireo olivaceus*	Green	Not Listed	Not Listed	Not Listed	T
Ruby-crowned Kinglet	*Regulus calendula*	Yellow	Not Listed	Not Listed	Not Listed	P
Savannah Sparrow	*Passerculus sandwichensis*	Green	Special Concern	Special Concern	Not Listed	T
Song Sparrow	*Melospiza melodia*	Green	Not Listed	Not Listed	Not Listed	P
Swainson's Thrush	*Catharus ustulatus*	Green	Not Listed	Not Listed	Not Listed	T
Tree Swallow	*Tachycineta bicolor*	Yellow	Not Listed	Not Listed	Not Listed	P
White-throated Sparrow	*Zonotrichia albicollis*	Green	Not Listed	Not Listed	Not Listed	P
Yellow Warbler	*Dendroica petechia*	Green	Not Listed	Not Listed	Not Listed	T
Yellow-rumped Warbler	*Dendroica coronata*	Green	Not Listed	Not Listed	Not Listed	T

APPENDIX C
SHADOW FLICKER ASSESSMENT

Receptor ID	Easting	Northing	Distance to Turbine (m)	Shadow Hours Per Year [h/year]	Shadow Day Per Year [days/year]	Max Shadow Hours Per Day [h/day]
R1	402,151	4,953,018	1,561	0:00	0	0:00
R2	402,173	4,953,032	1,567	0:00	0	0:00
R3	401,783	4,952,787	1,307	0:00	0	0:00
R4	402,407	4,952,707	1,899	0:00	0	0:00
R5	401,736	4,952,949	1,188	13:04	65	0:18
R6	401,793	4,953,015	1,213	0:00	0	0:00
R7	402,158	4,953,005	1,561	3:06	20	0:13
R8	402,200	4,952,629	1,747	0:00	0	0:00
R9	399,789	4,952,522	1,290	0:00	0	0:00
R10	401,710	4,952,954	1,162	15:32	67	0:18
R11	402,257	4,952,653	1,786	0:00	0	0:00

APPENDIX D
THIRD PARTY CORRESPONDENCE

Communication with Environment Canada

From: <weatherradars@ec.gc.ca>
Date: Mon, Mar 26, 2012 at 11:11 AM
Subject: RE: Kaizer Meadow Wind Project
To: cpeters@minas.ns.ca, weatherradars@ec.gc.ca

Dear Mr. Chris Peters,

Thank you for contacting the Meteorological Service of Canada, a branch of Environment Canada, regarding your wind energy intentions.

Our preliminary assessment of the information provided to us via e-mail on March 22, 2012 indicates that any potential interference that may be created by the Kaizer Meadow Wind Project in Lunenburg County, Nova Scotia will not be severe. Although we would prefer our radar view to be interference free, this is not always reasonable. As a consequence, we do not have strong objections to the current proposal.

If your plans are modified in any manner (e.g. number of turbines, height, placement or materials) this analysis would no longer be valid. An updated analysis must be conducted.

Please contact us at: weatherradars@ec.gc.ca.

Thank you for your ongoing cooperation and we wish you success.

Best Regards,

Carolyn J. Rennie
Student – National Radar Program
Supervisor – Stephen Holden
Meteorological Service of Canada
Environment Canada
4905 Dufferin Street
Toronto, Ontario M3H 5T4
Cell : 289-221-1084

From: Rennie,Carolyn [Ontario]
Sent: Thursday, March 22, 2012 9:22 AM
To: Weather Radars Contact,National Radar Program [Ontario]
Subject: FW: Kaizer Meadow Wind Project

From: cpeters@minas.ns.ca [mailto:cpeters@minas.ns.ca]
Sent: Thursday, March 22, 2012 9:20 AM
To: Rennie,Carolyn [Ontario]
Subject: Kaizer Meadow Wind Project

Good morning,

My name is Chris Peters and I am an Energy Project Developer with Minas Basin Pulp and Power. I am currently developing a small wind project consisting of one 2 MW wind turbine on Kaizer Meadow Road in Lunenburg County, Nova Scotia.

I would like your input on potential interference between your weather RADAR stations and the attached coordinates of the potential turbine location.

Coordinates: N 44° 43.663 W 64° 15.268

The turbine location is in UTM Zone 20 (NAD83). I have also included a map showing the proposed turbine location.

The proposed turbine has the following specifications:

98 m tubular steel or concrete tower
Rotor, consisting of three blades, with a diameter of 82 m (carbon fiber-reinforced plastic).

I would appreciate a response indicating whether or not there is a potential conflict. If there is a potential conflict, I would like to follow up with more detailed conversation.

Best regards,

Chris Peters
Minas Basin Pulp & Power
cpeters@minas.ns.ca
902 684 3052

Communication with DND

Chris,

We have completed the detailed analysis of your proposed site, Keizer Meadow Road, located in Lunenburg County, NS (WTA-2039). The results of our detailed analysis have shown that there is likely to be no interference with DND radar and flight operations. Therefore, as a result of these findings we have no objections with your project as submitted (as indicated below). If however, the layout were to change/move, please re-submit that proposal for another assessment using the assigned WTA number listed above. The concurrence for this site is valid for 24 months from date of this email. If the project should be cancelled or delayed during this timeframe please advise this office accordingly.

It should be noted that our office looks at each submission on a case by case basis and as such, concurrence on this submission in no way constitutes a concurrence for similar projects in the same area, nor does it indicate that similar concurrence might be offered in another region.

Finally, the concurrence offered in this email extends only to the subject projects and current proponent. Should the project or any part of it be altered, or be sold to another developer, this office must be notified and we reserve the right to reassess the project.

Thank you for your patience on this matter and for considering DND radar and airport facilities in your project development process.

If you have any questions feel free to contact me.

Thank you.

Coordinates: N 44° 43.663 W 64° 15.268
98 m tubular steel or concrete tower
Rotor, consisting of three blades, with a diameter of 82 m (carbon fiber-reinforced plastic).

<<site_map.JPG>>

Adin Switzer
Capt
AEC Liaison Officer
CCISF/ESICC
ATESS/ESTTMA
Défense nationale | National Defence

8 Wing Trenton, Astra, ON K0K 3W0

TEL: 613 392-2811 Ext4834 (CSN: 827-4834)
FAX: 613 965-3200
Gouvernement du Canada | Government of Canada

Communication with RCMP – no response to date

From: <Chris.Peters@minasenergy.com>
Date: Thu, Mar 22, 2012 at 10:16 AM
Subject: Wind Facility
To: alex.beckstead@rcmp-grc.gc.ca
Cc: Windfarm_Coordinator@rcmp-grc.ca

Good morning,

My name is Chris Peters and I am an Energy Project Developer with Minas Basin Pulp and Power. I am currently developing a small wind project consisting of one 2 MW wind turbine on Kaizer Meadow Road in Lunenburg County, Nova Scotia.

I would like your input on potential interference between the radiocommunications operated by your agency (such as fixed links, mobile stations or satellite) and the attached coordinates of the potential turbine location.

Coordinates: N 44° 43.663 W 64° 15.268

The turbine location is in UTM Zone 20 (NAD83). I have also included a map showing the proposed turbine location.

The proposed turbine has the following specifications:

98 m tubular steel or concrete tower
Rotor, consisting of three blades, with a diameter of 82 m (carbon fiber-reinforced plastic).

I would appreciate a response indicating whether or not there is a potential conflict. If there is a potential conflict, I would like to follow up with more detailed conversation.

Best regards,

(See attached file: site_map.JPG)

Chris Peters
Minas Basin Pulp & Power
cpeters@minas.ns.ca
902 684 3052

June 7, 2012

Your file
Kaizer Meadow Road in Lunenburg County, NS
Our file
12-1104

Mr. Chris Peters
Minas Basin Pulp & Power

RE: Wind Structures: Wind Turbine - Lunenburg County, NS
(N44° 43' 39.78" W64° 15' 16.08" / 456.0367' AGL / 1145.0131' AMSL)

Mr. Peters,

We have evaluated the captioned proposal and NAV CANADA has no objection to the project as submitted.

While this proposed wind structure is acceptable, it does not constitute NAV CANADA's approval for any additional structures at this location. The nature and magnitude of electronic interference to NAV CANADA ground-based navigation aids, including RADAR, due to wind turbines depends on the location, configuration, number, and size of turbines; all turbines must be considered together for analysis. The interference of wind turbines to certain navigation aids is cumulative and while initial turbines may be approved, continued development may not always be possible.

In the interest of aviation safety, it is incumbent on NAV CANADA to maintain up-to-date aeronautical publications and issue NOTAM as required. To assist us in that end, we ask that you notify us at least 10 business days prior to the start of construction. This notification requirement can be satisfactorily met by returning a completed, signed copy of the attached form by e-mail at landuse@navcanada.ca or fax at 613-248-4094. In the event that you should decide not to proceed with this project or if the structure is dismantled, please advise us accordingly so that we may formally close the file.

If you have any questions, contact the Land Use Department by telephone at 1-866-577-0247 or e-mail at landuse@navcanada.ca.

NAV CANADA's land use evaluation is valid for a period of 12 months. Our assessment is limited to the impact of the proposed physical structure on the air navigation system and installations; it neither constitutes nor replaces any approvals or permits required by Transport Canada, Industry Canada, other Federal Government departments, Provincial or Municipal land use authorities or any other agency from which approval is required. Industry Canada addresses any spectrum management issues that may arise from your proposal and consults with NAV CANADA engineering as deemed necessary.

Yours truly,

Scott English
for
David Legault
Manager, Data Collection
Aeronautical Information Services

cc ATLR - Atlantic Region, Transport Canada

NOVA SCOTIA

Communities, Culture & Heritage
Heritage Division

1747 Summer Street
Halifax, Nova Scotia
B3H 3A6

Tel: (902) 424-6475
Fax: (902) 424-0560

September 12, 2011

Chris Peters
Minas Basin Pulp & Power
53 Prince Street
PO Box 401
Hantsport, NS B0P 1P0

Dear Mr. Peters:

RE: **Rush Environment Screening 11-08-26**
Kaizer Meadows Wind Project
Minas Basin Pulp & Power

Further to your request of August 26, 2011, staff of the Heritage Division have reviewed their files for reference to the presence of heritage resources in the study area. Please be aware that our information is not comprehensive, in that it is incomplete and of varying degrees of accuracy with respect to the precise location and condition of heritage resources.

Archaeological and Historical Site Remains

Staff would like to note that there are no recorded archaeological sites located within the study area. Potential for pre-contact First Nations archaeological sites is low. Historical maps of the study area show no settlement related features. Therefore, potential for historic period archaeological sites is low.

Based on this desktop study, an Archaeological Impact Assessment is not necessary. In the unlikely event archaeological resources should be discovered, work should stop and contact be made with the Heritage Division.

Botany

Staff would like to note that there are no plant species-at-risk reported from this area. However, that is not to say they are not present, but the Card Lake area has been poorly studied for plants. It would be advisable to record all plant species found and include this in a final report.

Zoology

The Heritage Division acknowledges that Minas Basin Pulp & Power will be hiring an environmental services company to prepare an Environmental Impact Statement which will include Zoological information of the project area.

Palaeontology

Staff notes that this site is underlain by granite and therefore do not expect palaeontological occurrences.

I have attached an invoice for the staff time spent reviewing our records and compiling this response. If you have any questions, please contact me at 424 6475.

Sincerely,

Laura Bennett,
Coordinator, Special Places

APPENDIX E
ROAD MODIFICATION CONSTRUCTION DRAWINGS

SWING OVER LIMITS – AREA MUST BE KEPT CLEAR OF OBSTRUCTIONS

PROPOSED 750ø CONCRETE STORM ENTRANCE (SEE PIPE ENTRANCE DETAIL) SHAPE DITCH TO ENCOURAGE DRAINAGE INTO CULVERT ENTRANCE.

PROPOSED 750ø CONCRETE STORM @ MIN 1%. INCL. 45° BEND

PROPOSED EDGE OF GRAVEL

PROPOSED 450ø CONCRETE STORM @ MIN 1%

ROUTE 14

EX 750ø ST

SWING OVER LIMIT

EX DITCH

SWING OVER LIMIT

PROPOSED DITCH

EX. EDGE OF GRAVEL

EX. EDGE OF ASPHALT

EX. EDGE OF ASPHALT

PROPOSED DITCH

SWING OVER LIMIT

EX. O/H WIRE

TREELINE

EX 450ø ST (TO BE ABANDONED)

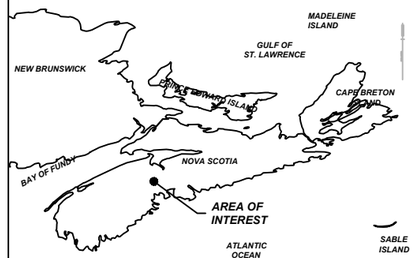
KAIZER MEADOW ROAD

CONTRACTOR TO COORDINATE WITH NS POWER TO HAVE EXISTING UTILITY POLE RELOCATED. NEW POLE MUST BE MIN. 3.0m FROM EDGE OF GRAVEL.

EDGE OF GRAVEL

PROPOSED DITCH

KEY PLAN



LEGEND

- CLEARING LIMITS/SWING AREA - FREE OF OBSTACLES
- TREELINE
- EX. EDGE OF GRAVEL
- EX. OVERHEAD ELECTRICAL
- PROPOSED DITCH
- PROPOSED EDGE OF GRAVEL
- PROPOSED EDGE CRANE PAD
- HYDROPOLE
- GRADIENT
- CONCRETE CULVERT ENTRANCE

CLIENT: MINAS BASIN

PROJECT:

KAIZER MEADOW ROAD CIVIL WORKS

SITE LOCATION:

KAIZER MEADOW ROAD, NOVA SCOTIA

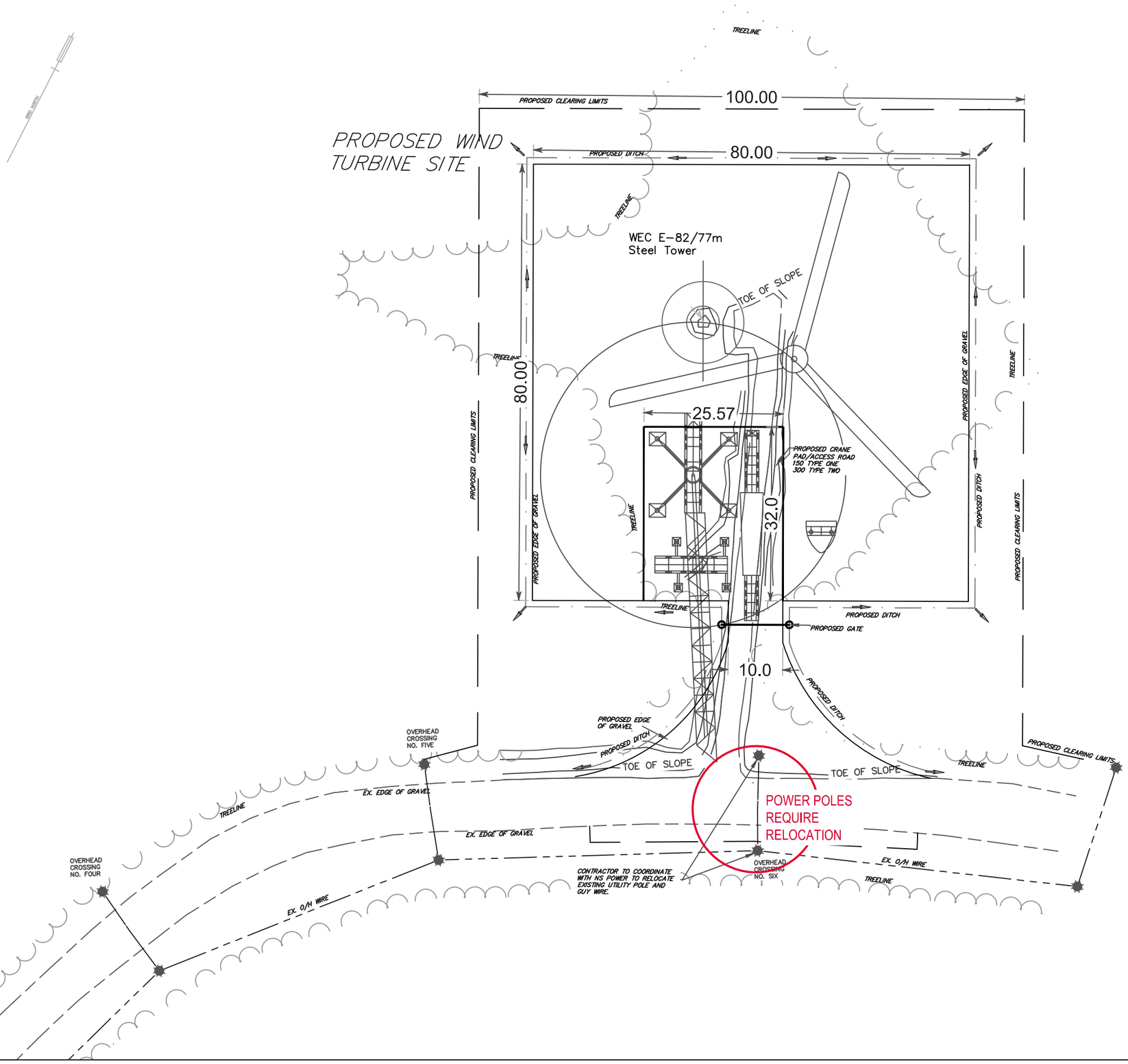
DRAWING TITLE:

PROPOSED UPGRADES TO INTERSECTION OF KAIZER MEADOW ROAD & ROUTE 14

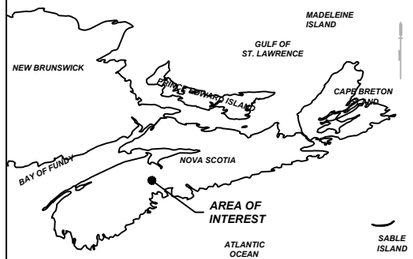
Strum ENVIRONMENTAL

DATE:	PROJECT #:
JULY 2012	12-4360
SCALE: 1:300	DRAWING #: C-203
DRAWN BY: R. McKINNON	
CHECKED BY: A. WALTER	

S:\Strum Project Files\2012 Files\12-4359\Drawings\CAD Drawings\Kaizer Meadow Road Plan & Profile, 25m Cross Sections.dwg



KEY PLAN



LEGEND

- CLEARING LIMITS/SWING AREA - FREE OF OBSTACLES
- TREELINE
- EX. EDGE OF GRAVEL
- EX. OVERHEAD ELECTRICAL
- PROPOSED DITCH
- PROPOSED EDGE OF GRAVEL
- PROPOSED EDGE CRANE PAD
- HYDROPOLE
- GRADIENT
- CONCRETE CULVERT ENTRANCE

CLIENT: MINAS BASIN

PROJECT: KAIZER MEADOW ROAD CIVIL WORKS

SITE LOCATION: KAIZER MEADOW ROAD, NOVA SCOTIA

DRAWING TITLE: ***PROPOSED UPGRADES TO INTERSECTION OF KAIZER MEADOW RD & ACCESS RD***

Strum Environmental

DATE:	PROJECT #:
JULY 2012	12-4360
SCALE: 1:750	DRAWING #: C-204
DRAWN BY: R. McKINNON	
CHECKED BY: A. WALTER	

S:\Strum Project Files\2012 Files\12-4359\Drawings\CAD Drawings\Kaizer Meadow Road Plan & Profile, 25m Cross Sections.dwg

APPENDIX F
SOUND ASSESSMENT

Receptor ID	Easting	Northing	Predicted Sound Level (dBA)
R1	402,151	4,953,018	29.6
R2	402,173	4,953,032	29.5
R3	401,783	4,952,787	31.6
R4	402,407	4,952,707	27.3
R5	401,736	4,952,949	32.6
R6	401,793	4,953,015	32.4
R7	402,158	4,953,005	29.6
R8	402,200	4,952,629	28.3
R9	399,789	4,952,522	31.7
R10	401,710	4,952,954	32.9
R11	402,257	4,952,653	28
RV1	400,709	4,952,473	34.5
RV2	401,442	4,952,166	29.9
RV3	401,072	4,954,207	36.3
RV4	401,612	4,955,077	27.5
RV5	399,014	4,952,375	26.8
RV6	399,745	4,953,407	35.3
RV7	399,046	4,953,852	28.8
RV8	399,421	4,953,959	31.3
RV9	399,954	4,954,772	30.2
RV10	402,461	4,954,152	27.2
RV11	400,420	4,951,534	27
RV12	400,713	4,955,413	27
RV9	399,954	4,954,772	30.2
RV10	402,461	4,954,152	27.2
RV11	400,420	4,951,534	27
RV12	400,713	4,955,413	27

APPENDIX G
CONSULTATION AND ENGAGEMENT

MUNICIPALITY OF THE DISTRICT OF CHESTER

PO Box 369, Chester, NS B0J 1J0 151 King Street, Chester, NS
Telephone: 902-275-3554 Facsimile: 902-275-4771 email: administration@chester.ca

RE: 2011-511

September 14, 2011

Chris Peters
Minas Basin Pulp and Power Company Limited
53 Prince Street
P.O. Box 401,
Hantsport NS B0P 1P0

Dear Mr. Peters:

RE: COMFIT PROJECT

Further to your attendance at the September 8, 2011 meeting of Council, this will confirm that the following motion was approved:

2011-511 MOVED by Councillor Church-Cornelius, SECONDED by Councillor Armstrong that the following resolution be approved:

Whereas the Province of Nova Scotia has developed a community feed-in tariff program for renewable energy projects;

And whereas the Nova Scotia Utility and Review Board has set premium rates for renewable energy generated through the COMFIT program;

And whereas the Municipality of the District of Chester and Minas Basin Pulp and Power have been working together under an Memorandum of Understanding since October 1, 2009 to assess the feasibility of developing a wind energy project on municipally-owned property on Kaizer Meadow Road, located in the Municipality of the District of Chester in Lunenburg County;

And whereas, under the Municipal Government Act, the Municipality of the District of Chester must maintain 100% ownership of the COMFIT project and assets;

Be it resolved that the Municipality of the District of Chester will make application to the Province of Nova Scotia for a 1.5 MW large wind energy project on Kaizer Meadow Road, located in the Municipality of the District of Chester in Lunenburg County under the COMFIT program;

Be it further resolved that the Municipality of the District of Chester will continue to work with Minas Basin Pulp and Power on the COMFIT initiative, and will utilize Minas Basin Pulp and Power in a Project Management capacity, both for construction and operational phases, upon approval of the COMFIT application by the Province of Nova Scotia.

CARRIED.

Staff and Council look forward to working with you.

Yours truly,

Pamela Myra
Municipal Clerk

CC Erin Beaudin, CAO

Note: The council resolution specified the installation of a 1.5 MW project at Kaizer Meadow rather than the 2.3 MW included in this application. This is a function of the evolution of the project. The resolution does, however, demonstrate that the community supports the Kaizer Meadow Wind Project.

MINAS BASIN

September 13, 2011

Kwilmu'kw Maw-Klusuaqn Negotiation Office
Attn: Consultation Liaison Officer
851 Willow Street,
Truro, Nova Scotia
B2N 6N8

To whom it may concern,

We would like to inform you of the ongoing plans for a wind energy project located in central Nova Scotia. The Municipality of the District of Chester is currently proposing the development of a wind energy generator located at the Kaizer Meadow Environmental Management Centre. The project coordinates are N 44°43.663, W 64°15.268. The most proximate Mi'kmaq community to the project is the Glooscap First Nation located approximately 45 km from the site. This potential project is named the Kaizer Meadow Wind Project.

Currently, the Kaizer Meadow project is in the assessment and planning stages. Development activities for the proposed project will be undertaken by Minas Basin Pulp and Power along with the involvement of the Chester Municipal Government. The project will consist of a single wind turbine which will be connected to the distribution system. The project and the connection point will both be located on land owned by the Municipality of the District of Chester. The project will have a capacity of 2.3 MW.

Public consultation in relation to this project is ongoing and those interested in the project are encouraged to become involved and provide feedback. We would like to invite members of the Mi'kmaq First Nations to participate. If you have any questions, suggestions, or concerns, feel free to contact us.

Sincerely yours,

Chris Peters
Energy Project Developer
Minas Basin Pulp and Power

MINAS BASIN PULP AND POWER COMPANY LIMITED
P.O. Box 401, Hantsport, N.S. B0P 1P0
(902) 684-3236 Fax (902) 684-9618

Mary-Frances Lynch
Minas Basin Pulp and Power
53 Prince Street, Hantsport, NS
B0P 1P0

July 10, 2012

Nova Scotia Office of Aboriginal Affairs
5251 Duke St., 5th Floor
PO Box 1617
Halifax, NS B3J 2Y3

Attention: Alvaro Loyola
Reference: Kaizer Meadow Wind Project – Notice of Proposed Project

To whom it may concern,

We would like to inform you of the ongoing plans for a wind energy project located in central Nova Scotia. The Municipality of the District of Chester is currently proposing the development of a wind energy generator located at the Kaizer Meadow Environmental Management Centre. The project coordinates are N 44°43.663, W 64°15.268. The most proximate Mi'kmaq community to the project is the Glooscap First Nation located approximately 45 km from the site. This potential project is named the Kaizer Meadow Wind Project.

Currently, the Kaizer Meadow project is in the permitting and planning stages. Development activities for the project are being undertaken by Minas Basin Pulp and Power along with the involvement of the Chester Municipal Government. The project will consist of a single wind turbine which will be connected to the distribution system. The project and the connection point will both be located on land owned by the Municipality of the District of Chester. The project will have a capacity of 2 MW.

The Environmental Assessment is nearly complete and public consultation in relation to this project is ongoing and those interested in the project are encouraged to become involved and provide feedback. We would like to invite members of the Mi'kmaq First Nations to participate. If you have any questions, suggestions, or concerns, feel free to contact me at mary-frances.lynch@minasenergy.com.

Sincerely yours,

Mary-Frances Lynch
Minas Basin Pulp & Power

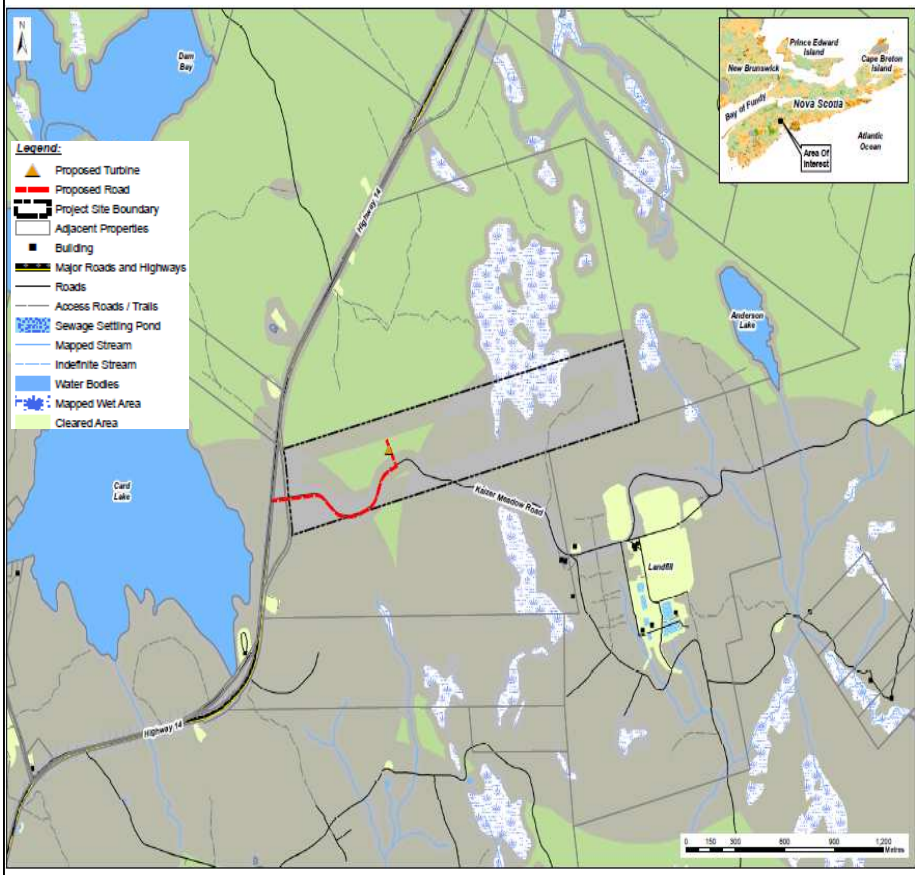
Kaizer Meadow Wind Project

Newsletter Summer 2012

What is the Kaizer Meadow Wind Project?

The Municipality of the District of Chester intends to construct and operate a single 2 MW turbine near the Kaizer Meadow Environmental Management Centre, located approximately 20 km north of the Village of Chester. Electricity produced from the project will be consumed locally by the Municipality of the District of Chester. The project will directly benefit the Municipality through 100% local ownership. Minas Basin Pulp and Power, a local company, is developing the project which will connect to the distribution system.

The project is subject to the provincial Environmental Assessment (EA) process. As part of this process, extensive studies have been conducted, including those related to birds, bats, wildlife, plants, wetlands, watercourses, groundwater, sound, and visual aesthetics. As included in the EA, below is a photographic example of what a single turbine may look like from a particular vantage point in the area. The EA is currently being completed by Minas Basin Pulp and Power and Strum Environmental and will be registered with Nova Scotia Environment by the end of July.



View of a standard turbine, looking east into Project Site. Photo taken near Highway 14 and Kaizer Meadow Road junction.

Come join us!

Open House
Kaizer Meadow Environmental Management Centre, 450 Kaizer Meadow Road, August 21st at 1 pm

Special Council Meeting
151 King St., Chester, NS, August 23rd at 9am

Contact Us

Please feel free to contact us at any time. Questions or concerns can be directed to:

Chris Peters
(902) 684-1104
chris.peters@minasenergy.com

Bruce Forest
(902) 275-2330
bforest@chester.ca

Kaizer Meadow Wind Project

What does this project mean for the community?

The project will help the local community become an important part of Nova Scotia's renewable energy future. Local ownership would bring long-term economic benefits to the community as well as increased energy security.

Who owns the project?

The Municipality of the District of Chester will own 100% of the Kaizer Meadow Wind Project. Local company, Minas Basin Pulp and Power, is developing the project on behalf of the Municipality—assisting in permitting, turbine selection, interconnection, project development, and planning.

Where exactly will it be located?

A single turbine will be located near the Kaizer Meadow Environmental Management Centre, approximately 20 km north of the Village of Chester. The project is centered at 400661.59 E and 4953469.27 N (20T; NAD 83) and comprises approximately 82.6 ha of land zoned as resource. The site is bordered by Kaizer Meadow Rd. to the south, Hwy 14 to the west, forested lands to the north, and the entrance to the Kaizer Meadow Environmental Management Centre located approximately 1.1 km to the east. The project is located greater than 2 km away from the nearest residence.

What are the Province's goals for renewable energy development?

The Government of Nova Scotia has set renewable electricity targets where 20% of generation will come from renewable energy sources by 2015 and 40% by 2020. The Kaizer Meadow Wind Project and other small Community Feed-In Tariff projects will contribute to Nova Scotia's target for renewable energy generation.

What is the Nova Scotia Community Feed-In Tariff Program?

A Feed-In Tariff or FIT is a straightforward way to contract for renewable energy generation. It provides standardized program rules, prices and contracts and ultimately encourages the development of the renewable energy sector.

Nova Scotia's Community Feed-In Tariff (COMFIT) program is designed to increase local ownership of small-scale renewable energy projects throughout the Province. To be eligible, the projects must be community-owned and connected at the distribution level (i.e., typically under 6 MW).

Image of typical wind turbine.

Thank You!

We look forward to working with the local community on the Kaizer Meadow Wind Project.