

**KENT HILLS 3: KENT HILLS WIND FARM EXPANSION PHASE 3**

Appendix F Passerine and Diurnal Raptor Migration Survey Protocol and Results

**Appendix F PASSERINE AND DIURNAL RAPTOR MIGRATION  
SURVEY PROTOCOL AND RESULTS**

## **KENT HILLS 3: KENT HILLS WIND FARM EXPANSION PHASE 3**

Appendix F Passerine and Diurnal Raptor Migration Survey Protocol and Results

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### Appendix F Passerine and Diurnal Raptor Migration Survey Protocol and Results

#### Introduction

Migration monitoring, targeting passerine species, was conducted during the 2017 spring season, utilizing protocol consistent with that used during past studies which occurred from 2006-2008. The 2017 surveys identified a total of 63 species, predominantly landbirds. The majority (91%) of the individuals observed were foraging, resting, or flying within 60 m of the ground. Observations of waterfowl and waterbirds were rare (1% of all individuals observed).

Diurnal raptor passage monitoring was also conducted during the spring migration monitoring in the spring of 2017. No concentrations of raptors were observed during the surveys, and all observations were of individual birds. Thirty-six raptors, comprising six species were observed during the course of the surveys, many of which were likely repeat observations of locally breeding individuals.

#### Methodology

Stantec took into consideration the information and guidance provided in Environment Canada's guidelines for wind turbines and birds (Environment Canada 2006a) and survey protocols document (Environment Canada 2006b), as well as previous guidance from the Canadian Wildlife Service (CWS) on methodology, timing and frequency of surveys when developing survey protocols.

For the purposes of data collection, a study area was defined within which observations of birds were made. The study area included the areas of proposed expansion, and is shown along with the survey stations on Figure F1.

Nine survey stations were established, one at or near each of the proposed turbine locations, and accessed using existing access roads (mainly forestry roads). Surveys comprised of a 10-minute watch count were conducted over the course of one morning at each of the survey stations. Watch counts began approximately 30 minutes prior to sunrise, and were concluded before 10:00 am. All birds noted by visual or auditory cues were recorded, along with the date of survey, environmental conditions and behavioural data including activity, direction of flight, and relative height of flight for each observation.

Following migration monitoring surveys, a 4-hour watch count targeting migrating raptors was conducted at a point of relatively high elevation near Hayward Pinnacle. The survey began near 9:00am on each survey day, and concluded around 1:00 pm, while environmental conditions were suitable. Using binoculars and a spotting scope, the surveyor scanned for birds in flight from all visible directions. Information collected during this survey included environmental data, observations of all migrating birds, and behavioural data including relative flight height and direction of travel.

Previous guidance from CWS for migration monitoring conducted in previous years (Jacques Whitford 2007) specified surveys be conducted every five days during the shoulder periods of migration, and every three days during the peak periods of migration. During spring, this

### KENT HILLS 3: KENT HILLS WIND FARM EXPANSION PHASE 3

#### Appendix F Passerine and Diurnal Raptor Migration Survey Protocol and Results

translates into surveys conducted every five days between April 15 – April 30 and May 21-31, and surveys conducted every three days between May 1-20, for a total of up to 13 survey days. Surveys conducted in 2017 will followed this schedule, with a slight modification for health and safety purposes, to allow the surveyor to be present during days when Trans Alta staff were on site.

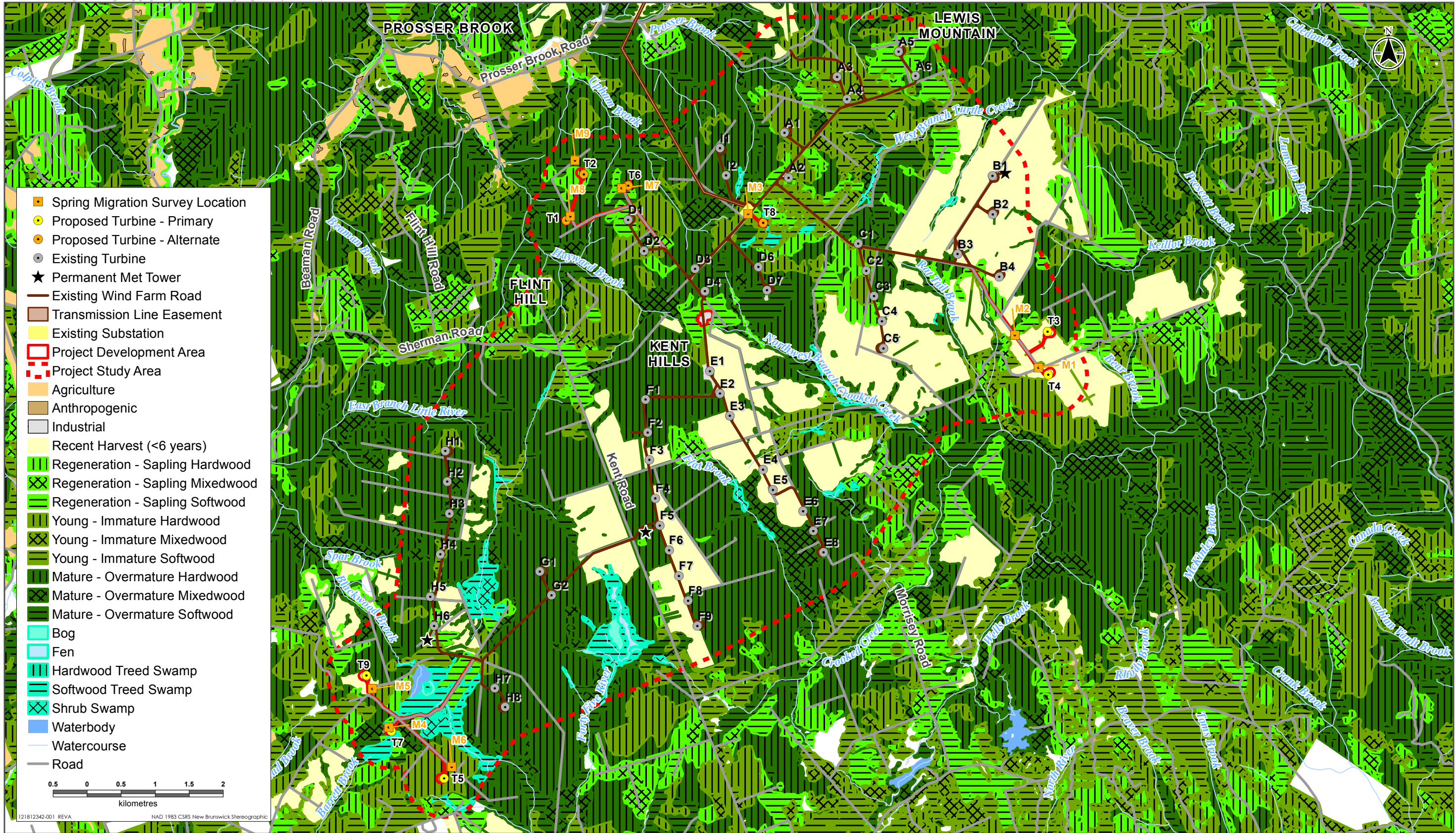
#### Results

The Kent Hills Wind Farm is located in the Southern New Brunswick Uplands Ecoregion, and is situated on a plateau. The land is currently owned by the province of New Brunswick (Crown Land), and contains logging roads which are frequently utilized by local residents. The habitat within the study area is predominantly hardwood forest, with some nursery/plantation areas. Table F.1 presents basic habitat information on each of the 9 survey stations. These habitats represent a cross-section of habitats found throughout the study area.

**Table F.1 Habitat Description of Each Sample Station**

Station #	Habitat
M1	Clear cut and partially-harvested hardwood forest
M2	Clear cut, partially-harvested, and regenerating hardwood forest
M3	Young to immature softwood forest. Near substation
M4	Regenerating softwood and softwood treed swamp
M5	Clear cut and partially-harvested hardwood forest
M6	Young to immature hardwood forest.
M7	Mature mixedwood and sapling softwood forest
M8*	Partially-harvested mature hardwood forest
M9	Mature hardwood forest
* location of raptor watch survey	

Surveys were conducted on 11 separate days within the spring migration period between April 18 and May 29, 2017. Environmental conditions encountered on each survey day are presented in Table F.2.



Sources: Government of New Brunswick

Service Layer Credits:

2017 Spring Migration Survey Locations



## KENT HILLS 3: KENT HILLS WIND FARM EXPANSION PHASE 3

### Appendix F Passerine and Diurnal Raptor Migration Survey Protocol and Results

**Table F.2 Summary of Environmental Conditions during Each Site Visit.**

Date	Temperature and Visibility	Relative Wind Speed and Direction
18-Apr	Cool and cloudy.	Moderate NE winds.
24-Apr	Cool and partly cloudy.	Moderate SE winds.
28-Apr	Warm and cloudy, with fog patches	Moderate SW winds.
1-May	Cool and cloudy.	Moderate SW winds.
4-May	Cool and partly cloudy.	Moderate NW winds.
8-May	Warm and cloudy.	Moderate SW winds.
11-May	Cool and cloudy with fog patches.	Moderate N winds.
16-May	Cool and cloudy. Intermittant drizzle.	Moderate N winds.
18-May	Warm and partly cloudy.	Moderate NW winds.
23-May	Cool and cloudy.	Moderate S winds.
29-May	Warm and cloudy.	Light NW winds.

#### Bird Species and Numbers Observed

Overall, the bird species noted during the 2017 monitoring program were expected for this environment, and are typical of the habitat types found in eastern New Brunswick. A total of 1,114 individual birds representing 63 species were observed within the study area during the 2017 spring migration period. Table F.3 below provides a list of the species encountered over the spring migration monitoring in past years (2006-2009) and for the spring season of 2017, including the relevant bird group and numbers of each species reported in each year.

**Table F.3 Bird Species Observed during Spring Migration Monitoring at Kent Hills Wind Farm**

Bird Group	Common Name	Latin Name	2006	2007	2009	2017
Gamebird	ruffed grouse	<i>Bonasa umbellus</i>	84		10	36
Landbird	mourning dove	<i>Zenaida macroura</i>	13			
Landbird	great horned owl	<i>Bubo virginianus</i>	4	4		2
Landbird	barred owl	<i>Strix varia</i>	19			
Landbird	long-eared owl	<i>Asio otus</i>	8	13		
Landbird	northern saw-whet owl	<i>Aegolius acadicus</i>	1	2		
Landbird	ruby-throated hummingbird	<i>Archilochus colubris</i>	4			1
Landbird	belted kingfisher	<i>Ceryle alcyon</i>				1
Landbird	yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	190	5	13	19
Landbird	downy woodpecker	<i>Picoides pubescens</i>	89	2	4	11

### KENT HILLS 3: KENT HILLS WIND FARM EXPANSION PHASE 3

Appendix F Passerine and Diurnal Raptor Migration Survey Protocol and Results

**Table F.3 Bird Species Observed during Spring Migration Monitoring at Kent Hills Wind Farm**

Bird Group	Common Name	Latin Name	2006	2007	2009	2017
Landbird	hairy woodpecker	<i>Picoides villosus</i>	53	3	4	3
Landbird	black-backed woodpecker	<i>Picoides arcticus</i>	1			
Landbird	northern flicker	<i>Colaptes auratus</i>	52	3	9	30
Landbird	pileated woodpecker	<i>Dryocopus pileatus</i>	13			1
Landbird	olive-sided flycatcher	<i>Contopus cooperi</i>			1	
Landbird	eastern wood-pewee	<i>Contopus virens</i>			1	
Landbird	yellow-bellied flycatcher	<i>Empidonax flaviventris</i>	4			
Landbird	alder flycatcher	<i>Empidonax alnorum</i>			3	
Landbird	willow flycatcher	<i>Empidonax traillii</i>	1			
Landbird	least flycatcher	<i>Empidonax minimus</i>	28		8	
Landbird	blue-headed vireo	<i>Vireo solitarius</i>	86		8	27
Landbird	red-eyed vireo	<i>Vireo olivaceus</i>	3		18	
Landbird	blue jay	<i>Cyanocitta cristata</i>	16	5	2	10
Landbird	American crow	<i>Corvus brachyrhynchos</i>	8			20
Landbird	common raven	<i>Corvus corax</i>	14	2	10	14
Landbird	tree swallow	<i>Tachycineta bicolor</i>				15
Landbird	barn swallow	<i>Hirundo rustica</i>	1			
Landbird	black-capped chickadee	<i>Poecile atricapillus</i>	118	10	2	39
Landbird	boreal chickadee	<i>Poecile hudsonica</i>	16	4		2
Landbird	red-breasted nuthatch	<i>Sitta canadensis</i>	12		2	9
Landbird	white-breasted nuthatch	<i>Sitta carolinensis</i>	13			
Landbird	brown creeper	<i>Certhia americana</i>	4			1
Landbird	winter wren	<i>Troglodytes troglodytes</i>	112	5	1	41
Landbird	golden-crowned kinglet	<i>Regulus satrapa</i>	48	9	1	33
Landbird	ruby-crowned kinglet	<i>Regulus calendula</i>	57		3	9
Landbird	eastern bluebird	<i>Sialia sialis</i>	5			4
Landbird	veery	<i>Catharus fuscescens</i>	1			
Landbird	Swainson's thrush	<i>Catharus ustulatus</i>	3			1
Landbird	hermit thrush	<i>Catharus guttatus</i>	338	3	5	48
Landbird	American robin	<i>Turdus migratorius</i>	340	63	25	167



### KENT HILLS 3: KENT HILLS WIND FARM EXPANSION PHASE 3

Appendix F Passerine and Diurnal Raptor Migration Survey Protocol and Results

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Bird Group	Common Name	Latin Name	2006	2007	2009	2017
Landbird	cedar waxwing	<i>Bombycilla cedrorum</i>				25
Landbird	Nashville warbler	<i>Vermivora ruficapilla</i>	18		6	
Landbird	northern parula	<i>Parula americana</i>	25		3	10
Landbird	chestnut-sided warbler	<i>Dendroica pensylvanica</i>	40		16	10
Landbird	magnolia warbler	<i>Dendroica magnolia</i>	146		19	33
Landbird	black-throated blue warbler	<i>Dendroica caerulescens</i>	61		14	12
Landbird	yellow-rumped warbler	<i>Dendroica coronata</i>	174	8	13	26
Landbird	black-throated green warbler	<i>Dendroica virens</i>	117		31	16
Landbird	Blackburnian warbler	<i>Dendroica fusca</i>	12			
Landbird	palm warbler	<i>Dendroica palmarum</i>	4	4	1	3
Landbird	blackpoll warbler	<i>Dendroica striata</i>	3			
Landbird	black-and-white warbler	<i>Mniotilta varia</i>	20		3	12
Landbird	American redstart	<i>Setophaga ruticilla</i>	49		4	4
Landbird	ovenbird	<i>Seiurus aurocapilla</i>	97		32	43
Landbird	northern waterthrush	<i>Seiurus noveboracensis</i>	1			
Landbird	mourning warbler	<i>Oporornis philadelphia</i>	6		10	5
Landbird	common yellowthroat	<i>Geothlypis trichas</i>	58		13	12
Landbird	Canada warbler	<i>Wilsonia canadensis</i>	1			
Landbird	American tree sparrow	<i>Spizella arborea</i>	1	3		
Landbird	chipping sparrow	<i>Spizella passerina</i>				1
Landbird	fox sparrow	<i>Passerella iliaca</i>				3
Landbird	song sparrow	<i>Melospiza melodia</i>	24	9	3	19
Landbird	Lincoln's sparrow	<i>Melospiza lincolni</i>	26		11	5
Landbird	swamp sparrow	<i>Melospiza georgiana</i>	3	3		
Landbird	white-throated sparrow	<i>Zonotrichia albicollis</i>	584	29	55	117
Landbird	dark-eyed junco	<i>Junco hyemalis</i>	267	46	22	62
Landbird	rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	18		1	
Landbird	red-winged blackbird	<i>Agelaius phoeniceus</i>		1		
Landbird	rusty blackbird	<i>Euphagus carolinus</i>	4	1		
Landbird	common grackle	<i>Quiscalus quiscula</i>	6	17		6

### KENT HILLS 3: KENT HILLS WIND FARM EXPANSION PHASE 3

Appendix F Passerine and Diurnal Raptor Migration Survey Protocol and Results

**Table F.3 Bird Species Observed during Spring Migration Monitoring at Kent Hills Wind Farm**

Bird Group	Common Name	Latin Name	2006	2007	2009	2017
Landbird	pine grosbeak	<i>Pinicola enucleator</i>	2			
Landbird	purple finch	<i>Carpodacus purpureus</i>	37	7	2	15
Landbird	red crossbill	<i>Loxia curvirostra</i>				6
Landbird	pine siskin	<i>Carduelis pinus</i>	3	1		
Landbird	American goldfinch	<i>Carduelis tristis</i>	10	1	4	35
Landbird	evening grosbeak	<i>Coccothraustes vespertinus</i>	6			3
Raptor	turkey vulture	<i>Cathartes aura</i>				7
Raptor	osprey	<i>Pandion haliaetus</i>	2			1
Raptor	bald eagle	<i>Haliaeetus leucocephalus</i>	4			10
Raptor	northern harrier	<i>Circus cyaneus</i>	3			
Raptor	sharp-shinned hawk	<i>Accipiter striatus</i>	2			1
Raptor	broad-winged hawk	<i>Buteo platypterus</i>	4			1
Raptor	red-tailed hawk	<i>Buteo jamaicensis</i>	11			16
Raptor	American kestrel	<i>Falco sparverius</i>	5		1	8
Raptor	merlin	<i>Falco columbarius</i>				2
Shorebird	solitary sandpiper	<i>Tringa solitaria</i>				1
Shorebird	Wilson's snipe	<i>Gallinago delicata</i>	1		1	
Shorebird	American woodcock	<i>Scolopax minor</i>	29	14		23
Waterbird	common loon	<i>Gavia immer</i>	2			1
Waterbird	double-crested cormorant	<i>Phalacrocorax auritus</i>	28	38		
Waterfowl	Canada goose	<i>Branta canadensis</i>		3		10
Waterfowl	wood duck	<i>Aix sponsa</i>		1		
Waterfowl	American black duck	<i>Anas rubripes</i>	1			5
Waterfowl	mallard	<i>Anas platyrhynchos</i>				1
Waterfowl	black scoter	<i>Melanitta nigra</i>		11		
Waterfowl	long-tailed duck	<i>Clangula hyemalis</i>		6		
Waterfowl	common merganser	<i>Mergus merganser</i>	1			
Totals			3675	336	395	1114

### KENT HILLS 3: KENT HILLS WIND FARM EXPANSION PHASE 3

Appendix F Passerine and Diurnal Raptor Migration Survey Protocol and Results

**Table F.4 Bird Species Observed during Fall Migration Monitoring at Kent Hills Wind Farm (2006-2008)**

Bird Group	Common Name	Latin Name	2006	2007	2008
Gamebird	ruffed grouse	<i>Bonasa umbellus</i>	1	11	1
Landbird	mourning dove	<i>Zenaida macroura</i>		2	
Landbird	great horned owl	<i>Bubo virginianus</i>		3	
Landbird	barred owl	<i>Strix varia</i>	14	12	
Landbird	long-eared owl	<i>Asio otus</i>	1	1	
Landbird	ruby-throated hummingbird	<i>Archilochus colubris</i>		16	3
Landbird	belted kingfisher	<i>Ceryle alcyon</i>		1	1
Landbird	yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	5	6	4
Landbird	downy woodpecker	<i>Picoides pubescens</i>	19	43	14
Landbird	hairy woodpecker	<i>Picoides villosus</i>	28	63	26
Landbird	northern flicker	<i>Colaptes auratus</i>	13	12	4
Landbird	pileated woodpecker	<i>Dryocopus pileatus</i>	1	1	1
Landbird	olive-sided flycatcher	<i>Contopus cooperi</i>		2	
Landbird	eastern wood-pewee	<i>Contopus virens</i>		2	3
Landbird	yellow-bellied flycatcher	<i>Empidonax flaviventris</i>			1
Landbird	alder flycatcher	<i>Empidonax alnorum</i>		2	
Landbird	least flycatcher	<i>Empidonax minimus</i>		2	2
Landbird	eastern phoebe	<i>Sayornis phoebe</i>		1	
Landbird	blue-headed vireo	<i>Vireo solitarius</i>	5	35	7
Landbird	Philadelphia vireo	<i>Vireo philadelphicus</i>		1	
Landbird	red-eyed vireo	<i>Vireo olivaceus</i>	38	62	43
Landbird	gray jay	<i>Perisoreus canadensis</i>	4	11	
Landbird	blue jay	<i>Cyanocitta cristata</i>	126	52	58
Landbird	American crow	<i>Corvus brachyrhynchos</i>	1		
Landbird	common raven	<i>Corvus corax</i>	30	100	23
Landbird	black-capped chickadee	<i>Poecile atricapillus</i>	90	286	63
Landbird	boreal chickadee	<i>Poecile hudsonica</i>	15	11	6
Landbird	red-breasted nuthatch	<i>Sitta canadensis</i>	9	41	9
Landbird	white-breasted nuthatch	<i>Sitta carolinensis</i>	6	17	23
Landbird	brown creeper	<i>Certhia americana</i>	3	4	2
Landbird	house wren	<i>Troglodytes aedon</i>		1	
Landbird	winter wren	<i>Troglodytes troglodytes</i>	9	3	
Landbird	golden-crowned kinglet	<i>Regulus satrapa</i>	64	36	16

### KENT HILLS 3: KENT HILLS WIND FARM EXPANSION PHASE 3

Appendix F Passerine and Diurnal Raptor Migration Survey Protocol and Results

**Table F.4 Bird Species Observed during Fall Migration Monitoring at Kent Hills Wind Farm (2006-2008)**

Bird Group	Common Name	Latin Name	2006	2007	2008
Landbird	ruby-crowned kinglet	<i>Regulus calendula</i>	22	16	6
Landbird	veery	<i>Catharus fuscescens</i>	1		
Landbird	Bicknell's thrush	<i>Catharus bicknelli</i>	3		
Landbird	Swainson's thrush	<i>Catharus ustulatus</i>	51	2	
Landbird	hermit thrush	<i>Catharus guttatus</i>	317	40	42
Landbird	American robin	<i>Turdus migratorius</i>	32	40	12
Landbird	bohemian waxwing	<i>Bombycilla garrulus</i>		16	
Landbird	cedar waxwing	<i>Bombycilla cedrorum</i>	1	62	14
Landbird	Tennessee warbler	<i>Vermivora peregrina</i>	2	2	1
Landbird	Nashville warbler	<i>Vermivora ruficapilla</i>	27	12	9
Landbird	northern parula	<i>Parula americana</i>	2	9	7
Landbird	yellow warbler	<i>Dendroica petechia</i>	3	5	
Landbird	chestnut-sided warbler	<i>Dendroica pensylvanica</i>	1	25	4
Landbird	magnolia warbler	<i>Dendroica magnolia</i>	25	31	18
Landbird	cape may warbler	<i>Dendroica tigrina</i>	1		
Landbird	black-throated blue warbler	<i>Dendroica caerulescens</i>	10	38	6
Landbird	yellow-rumped warbler	<i>Dendroica coronata</i>	80	34	13
Landbird	black-throated green warbler	<i>Dendroica virens</i>	66	48	30
Landbird	Blackburnian warbler	<i>Dendroica fusca</i>	6	1	
Landbird	palm warbler	<i>Dendroica palmarum</i>	18	15	10
Landbird	blackpoll warbler	<i>Dendroica striata</i>	8		2
Landbird	black-and-white warbler	<i>Mniotilta varia</i>	1	12	14
Landbird	American redstart	<i>Setophaga ruticilla</i>	1	53	2
Landbird	ovenbird	<i>Seiurus aurocapilla</i>	3	7	7
Landbird	mourning warbler	<i>Oporornis philadelphia</i>	5	34	3
Landbird	common yellowthroat	<i>Geothlypis trichas</i>	188	265	59
Landbird	Wilson's warbler	<i>Wilsonia pusilla</i>		1	
Landbird	Canada warbler	<i>Wilsonia canadensis</i>			1
Landbird	chipping sparrow	<i>Spizella passerina</i>	2		
Landbird	savannah sparrow	<i>Passerculus sandwichensis</i>	4	2	
Landbird	song sparrow	<i>Melospiza melodia</i>	16	28	9
Landbird	Lincoln's sparrow	<i>Melospiza lincolni</i>	20	21	6
Landbird	swamp sparrow	<i>Melospiza georgiana</i>	14	4	1

### KENT HILLS 3: KENT HILLS WIND FARM EXPANSION PHASE 3

Appendix F Passerine and Diurnal Raptor Migration Survey Protocol and Results

**Table F.4 Bird Species Observed during Fall Migration Monitoring at Kent Hills Wind Farm (2006-2008)**

Bird Group	Common Name	Latin Name	2006	2007	2008
Landbird	white-throated sparrow	<i>Zonotrichia albicollis</i>	212	451	161
Landbird	white-crowned sparrow	<i>Zonotrichia leucophrys</i>		4	
Landbird	dark-eyed junco	<i>Junco hyemalis</i>	50	138	90
Landbird	snow bunting	<i>Plectrophenax nivalis</i>		29	
Landbird	rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>		1	
Landbird	rusty blackbird	<i>Euphagus carolinus</i>	2	2	
Landbird	common grackle	<i>Quiscalus quiscula</i>	375		
Landbird	pine grosbeak	<i>Pinicola enucleator</i>	1	24	
Landbird	purple finch	<i>Carpodacus purpureus</i>	10	16	
Landbird	red crossbill	<i>Loxia curvirostra</i>			1
Landbird	white-winged crossbill	<i>Loxia leucoptera</i>	51	148	15
Landbird	pine siskin	<i>Carduelis pinus</i>	46	10	60
Landbird	American goldfinch	<i>Carduelis tristis</i>	8	31	18
Landbird	evening grosbeak	<i>Coccothraustes vespertinus</i>		67	3
Landbird	warbler sp.		179		
Landbird	sparrow sp.		2		
Landbird	unidentified landbird			74	48
Raptor	turkey vulture*	<i>Cathartes aura</i>	3	8	
Raptor	osprey	<i>Pandion haliaetus</i>	1	1	
Raptor	bald eagle	<i>Haliaeetus leucocephalus</i>	3	4	
Raptor	sharp-shinned hawk	<i>Accipiter striatus</i>	12	13	1
Raptor	cooper's hawk	<i>Accipiter cooperii</i>		1	
Raptor	northern goshawk	<i>Accipiter gentilis</i>	2	9	
Raptor	broad-winged hawk	<i>Buteo platypterus</i>	9	1	
Raptor	red-tailed hawk	<i>Buteo jamaicensis</i>	12	25	1
Raptor	golden eagle	<i>Aquila chrysaetos</i>		1	
Raptor	American kestrel	<i>Falco sparverius</i>	4	23	2
Raptor	merlin	<i>Falco columbarius</i>	1		
Raptor	peregrine falcon	<i>Falco peregrinus anatum</i>		1	
Raptor	unidentified raptor			19	
Shorebird	solitary sandpiper	<i>Tringa solitaria</i>	2	5	
Shorebird	semipalmated sandpiper	<i>Calidris pusilla</i>		3	
Shorebird	American woodcock	<i>Scolopax minor</i>	5	17	1

## KENT HILLS 3: KENT HILLS WIND FARM EXPANSION PHASE 3

Appendix F Passerine and Diurnal Raptor Migration Survey Protocol and Results

**Table F.4 Bird Species Observed during Fall Migration Monitoring at Kent Hills Wind Farm (2006-2008)**

Bird Group	Common Name	Latin Name	2006	2007	2008
Waterbird	red-throated loon	<i>Gavia stellata</i>		5	
Waterbird	common loon	<i>Gavia immer</i>		2	
Waterbird	unidentified waterbird			2	
Waterfowl	Canada goose	<i>Branta canadensis</i>	37		1
Waterfowl	unidentified waterfowl			1	
	unidentified bird			3	
Totals			2439	2802	988

### Behaviour Data

Different bird groups demonstrated differences in potential sensitivity to the presence of wind turbines (Kingsley and Whittam 2004), so the data on migration have been summarized according to seven bird groups: water fowl (including ducks and geese), waterbirds (including herons, gulls and cormorants), shorebirds (including plovers and sandpipers), raptors (including hawks, falcons, eagles, and for the purposes of this summary, vultures), owls, and gamebirds (including grouse), as indicated in the above table.

**Error! Reference source not found.** F.4 summarizes the flying heights of the bird groups observed during surveys. Modifications to the height categories were made in consideration of the dimensions of the proposed new wind turbines. \Birds observed within 10 m of the ground were considered at Tree (T) level; those from 10 to 60 m of the ground were considered to be "Above Tree" (AT) height; those flying between 60 m – 120 m above ground were considered to be "Well Above Tree" (WAT) height; those birds observed flying 120-180 m were characterized as "High" (H) and those above 180 m were classified as very high (VH). WAT and H height classifications correspond with the blade sweep of the turbines proposed for Kent Hills 3.

Migration surveys recorded a total of 63 species, and the majority of birds observed (91% of individual birds) were within 60 m of the ground. Six percent of the birds were observed flying at 60 – 180 m. Out of a total of 1115 birds observed, less than one percent were observed flying above 180 m. The most frequently recorded birds in the WFSa were American robin, white-throated sparrow, dark-eyed junco, and winter wren; however, hermit thrush were the fourth most numerous species after American robin, white-throated sparrow, and dark-eyed junco. Waterfowl observations were rare, with four records of American black duck, two records of small flocks of Canada goose, and a single record of mallard. No waterbirds were observed.

### KENT HILLS 3: KENT HILLS WIND FARM EXPANSION PHASE 3

#### Appendix F Passerine and Diurnal Raptor Migration Survey Protocol and Results

**Table F.4 Relative heights of birds observed during spring migration, 2017**

Bird Group	Height <sup>1</sup>					N <sup>2</sup>
	T	AT	WAT	H	VH	
Gamebirds	100% (100%)	-	-	-	-	50 (59)
Landbirds	96% (92%)	4% (7%)	<1% (<1%)	<1% (<1%)	-	664 (989)
Owls	100% (100%)	-	-	-	-	2 (2)
Raptors	20% (21%)	16% (15%)	13% (13%)	31% (30%)	20% (21%)	45 (47)
Shorebirds	100% (100%)	-	-	-	-	1 (1)
Waterbirds	-	-	-	-	-	-
Waterfowl	25% (12%)	50% (35%)	13% (6%)	13% (47%)	-	8 (17)
Total	91% (89%)	5% (7%)	1% (1%)	2% (2%)	1% (<1%)	770 (1115)
Notes:						
<sup>1</sup> Data presented are percentage of observations (percentage of individual birds) observed in each area.						
<sup>2</sup> Total number of observations (total number of individual birds).						

Based on historic and more recent field surveys undertaken to date for the Kent Hills Wind Farm, and knowledge of migration within the region, the WFSA does not provide important habitat for migrating birds and does not host significant numbers of migrant birds during either the spring or the fall. There are no significant landform features to concentrate migrants within the WFSA. Results of migration surveys planned for autumn 2017 will be provided as a supplemental report to confirm assumptions made based on past surveys and post-construction monitoring.

#### Species at Risk and Species of Conservation Concern

One SAR was observed during the 2017 spring migration monitoring program. Bald Eagle (Table F.5), which is considered Endangered by NB SARA, was observed singly on 10 occasions during raptor passage surveys. Additionally, four SOCC were observed during the 2017 spring migration monitoring program, including solitary sandpiper, turkey vulture, red crossbill, and evening grosbeak.

**Table F.5 SAR and SOCC Observed during the 2017 Spring Migration Monitoring Period**

Bird Group	Common Name	Latin Name	Number Observed	SARA	COSEWIC	NB SARA	AC CDC S-Rank
Shorebird	solitary sandpiper	<i>Tringa solitaria</i>	1				S2B,S5M
Raptor	turkey vulture	<i>Cathartes aura</i>	7				S3B,S3M

### KENT HILLS 3: KENT HILLS WIND FARM EXPANSION PHASE 3

Appendix F Passerine and Diurnal Raptor Migration Survey Protocol and Results

**Table F.5 SAR and SOCC Observed during the 2017 Spring Migration Monitoring Period**

Bird Group	Common Name	Latin Name	Number Observed	SARA	COSEWIC	NB SARA	AC CDC S-Rank
Raptor	<b>bald eagle</b>	<i>Haliaeetus leucocephalus</i>	10			Endangered	S4
Landbird	red crossbill	<i>Loxia curvirostra</i>	6				S3
Landbird	evening grosbeak	<i>Coccothraustes vespertinus</i>	3				S3B,S3S4N,SUM
*SAR are presented in <b>bold</b> text.							