

E

Bird Data (BBA, BBS, CBC) Tables

Table E-1 Bird Species and Their Breeding Status in New York State Breeding Bird Atlas Blocks in the Project Area

Common Name	Listed Species	Block					
		2271B	2272B	2272C	2272D	2372A	2372C
Canada Goose		PO	C	PO	C	C	C
Wood Duck		PR	C	PO	PR	PR	PO
Mallard		PR	PR	PO	C	PR	PO
Hooded Merganser		-	C	-	-	-	-
Northern Bobwhite		-	-	-	-	-	PO
Ring-necked Pheasant		PO	-	-	PO	PO	-
Ruffed Grouse		PO	PR	PO	-	-	PO
Wild Turkey		PO	C	PO	PO	PO	C
Great Blue Heron		PO	C	PO	PO	PO	PO
Green Heron		PO	C	PO	-	PO	PR
Turkey Vulture		PO	PO	PO	PO	PO	PO
Northern Harrier	T	C	-	PO	-	-	PO
Sharp-shinned Hawk	SC	-	-	-	C	-	C
Red-shouldered Hawk	SC	PO	PR	PO	-	-	PO
Broad-winged Hawk		PO	C	PO	-	PO	-
Red-tailed Hawk		PO	PR	PR	PR	PO	PO
American Kestrel		PO	-	PO	PO	C	PO
Virginia Rail		-	-	-	-	PO	-
Killdeer		PO	PO	PR	PR	PO	C
Spotted Sandpiper		-	PO	-	-	-	-
Upland Sandpiper	T	-	-	PO	-	-	-
Wilson's Snipe		-	-	PO	PR	PO	-
American Woodcock		PO	PO	PO	PO	PO	PO
Rock Pigeon		PO	C	C	C	C	PO
Mourning Dove		C	C	PR	C	C	PR
Black-billed Cuckoo		-	PO	PO	-	PO	-
Yellow-billed Cuckoo		-	-	PO	PO	-	PO
Eastern Screech-Owl		PO	PO	PO	PO	PO	-
Great Horned Owl		-	PR	PO	PR	PO	-
Barred Owl		PO	PR	PR	PO	PR	PR
Northern Saw-whet Owl		-	PO	PO	PR	PO	PO
Ruby-throated Hummingbird		PO	C	PR	PR	PO	PR
Belted Kingfisher		C	C	PO	PO	-	-
Red-bellied Woodpecker		-	PO	PO	PR	PO	-
Yellow-bellied Sapsucker		PO	C	C	PR	C	C
Downy Woodpecker		C	C	PR	PO	C	PO
Hairy Woodpecker		C	C	PO	PO	C	PO
Northern Flicker		PO	PR	PR	PR	C	C
Pileated Woodpecker		PO	PR	PO	PO	PO	PR
Eastern Wood-Pewee		PR	PR	PR	PO	PR	PR
Acadian Flycatcher		-	PR	-	-	-	-

Table E-1 Bird Species and Their Breeding Status in New York State Breeding Bird Atlas Blocks in the Project Area

Common Name	Listed Species	Block					
		2271B	2272B	2272C	2272D	2372A	2372C
Alder Flycatcher		PO	PR	PR	PR	PO	PR
Willow Flycatcher		PO	-	PR	PR	PO	PR
Least Flycatcher		PR	PR	PO	PR	PO	PO
Eastern Phoebe		PR	C	C	C	C	PR
Great Crested Flycatcher		PR	PR	PR	C	PR	PR
Eastern Kingbird		C	C	PR	PR	C	C
Blue-headed Vireo		PO	PO	PR	-	-	PR
Warbling Vireo		PR	-	PR	PR	PR	PR
Red-eyed Vireo		PO	PR	PR	PR	C	C
Blue Jay		PO	C	C	PR	C	PR
American Crow		PO	C	C	C	C	PR
Horned Lark	SC	-	-	PR	PR	PR	PO
Tree Swallow		C	C	C	C	C	C
Northern Rough-winged Swallow		PR	-	-	PO	PR	-
Bank Swallow		-	C	-	PO	-	-
Barn Swallow		PO	C	C	C	C	PR
Black-capped Chickadee		PR	C	PR	C	C	C
Tufted Titmouse		-	-	PO	-	PO	PO
Red-breasted Nuthatch		-	PR	PR	-	C	C
White-breasted Nuthatch		PO	C	PR	PO	C	PR
Brown Creeper		PR	PO	PR	-	PO	PR
House Wren		C	C	PR	PR	C	PR
Winter Wren		-	PR	-	-	-	PR
Golden-crowned Kinglet		PO	PO	PO	-	PO	PR
Eastern Bluebird		PR	C	PO	PR	C	PR
Veery		C	PR	PR	PR	PR	PR
Hermit Thrush		PR	PR	-	-	-	-
Wood Thrush		PR	PO	PR	PO	PO	C
American Robin		C	C	C	C	PR	C
Gray Catbird		C	PR	C	PR	PR	C
Brown Thrasher		PO	-	-	PR	PO	-
European Starling		C	C	C	C	C	C
Cedar Waxwing		-	C	PR	PR	PO	PR
Blue-winged Warbler		C	PR	PR	PR	PR	C
“Brewster's” Warbler		PO	-	-	-	-	-
Yellow Warbler		C	PO	PR	PR	C	PR
Chestnut-sided Warbler		PR	PR	PR	PR	C	C
Magnolia Warbler		PO	PR	PR	PR	C	PR
Black-throated Blue Warbler		-	-	-	-	-	C
Yellow-rumped Warbler		PO	PR	PR	PR	PR	PR

Table E-1 Bird Species and Their Breeding Status in New York State Breeding Bird Atlas Blocks in the Project Area

Common Name	Listed Species	Block					
		2271B	2272B	2272C	2272D	2372A	2372C
Black-throated Green Warbler		PR	PR	PR	PR	PO	PR
Blackburnian Warbler		PO	PO	PR	-	-	PR
Pine Warbler		-	PR	-	-	-	C
Prairie Warbler		PO	-	-	-	-	-
Black-and-white Warbler		-	PR	-	-	-	-
American Redstart		PO	PR	PO	PR	PR	PR
Ovenbird		PO	PR	PR	PR	PR	PR
Northern Waterthrush		-	PR	PR	-	-	-
Louisiana Waterthrush		-	-	-	PO	-	-
Mourning Warbler		PO	PR	PR	PR	C	C
Common Yellowthroat		PR	PR	PR	C	PR	C
Hooded Warbler		PO	PR	PR	PR	PR	C
Canada Warbler		-	-	-	-	PR	C
Scarlet Tanager		PR	PR	PR	PR	PO	PR
Eastern Towhee		C	PR	PR	PR	PO	PR
Chipping Sparrow		C	C	C	C	C	C
Field Sparrow		C	PR	PO	PR	PO	PR
Vesper Sparrow	SC	PO	PO	-	-	PR	-
Savannah Sparrow		PR	PR	C	C	C	PR
Grasshopper Sparrow	SC	-	-	-	-	-	PR
Song Sparrow		C	PR	PR	C	C	C
Swamp Sparrow		PO	PR	PR	C	PR	PO
White-throated Sparrow		-	PO	-	-	-	-
Dark-eyed Junco		C	C	C	PR	PR	C
Northern Cardinal		PR	PR	PR	PR	PO	PR
Rose-breasted Grosbeak		C	C	PR	PR	PO	C
Indigo Bunting		PR	PR	PR	C	C	PR
Bobolink		C	PO	C	PR	C	C
Red-winged Blackbird		PR	C	C	C	C	C
Eastern Meadowlark		-	-	-	PR	C	C
Common Grackle		PO	C	C	C	C	PO
Brown-headed Cowbird		PO	PR	PR	PR	PR	PR
Baltimore Oriole		-	PR	C	PR	C	PR
Purple Finch		PR	PR	PR	PR	C	PR
House Finch		PO	-	C	PR	PO	-
Pine Siskin		-	PR	-	-	-	-
American Goldfinch		PR	PR	PR	PR	PR	PR
House Sparrow		PO	C	C	C	C	C

Table E-1 Bird Species and Their Breeding Status in New York State Breeding Bird Atlas Blocks in the Project Area

Common Name	Listed Species	Block					
		2271B	2272B	2272C	2272D	2372A	2372C
Number of species reported as							
Possible Breeders		45	17	30	19	34	21
Probable Breeders		23	45	46	47	23	41
Confirmed Breeders		21	34	19	22	36	31
Species Total		89	96	95	88	93	93

Source: NYSDEC 2006

Key:

- E = Endangered
- SC = Special Concern
- T = Threatened
- PO = Possible
- PR = Probable
- C = Confirmed

Table E-2 Bird Species Recorded During East Java, Gainesville, Centerville, and Castile Breeding Bird Surveys

Common Name	Listed Species	Birds per Route			
		East Java	Gainesville	Centerville	Castile
Canada Goose		3.00	1.24	0.29	3.42
Wood Duck		-	0.07	0.16	1.19
American Black Duck		-	-	-	0.11
Mallard		1.77	6.03	0.29	6.31
Blue-winged Teal		-	-	0.03	0.25
Ring-necked Pheasant		1.60	8.48	0.81	8.25
Ruffed Grouse		0.06	-	0.03	0.03
Wild Turkey		0.20	-	0.03	0.11
Pied-billed Grebe	T	-	-	-	0.33
American Bittern	SC	-	0.17	-	0.08
Great Blue Heron		0.69	1.48	1.35	1.28
Green Heron		0.43	0.79	0.16	0.75
Turkey Vulture		0.06	0.66	0.13	0.44
Osprey	SC	0.03	-	-	-
Northern Harrier	T	0.03	0.45	0.29	0.14
Sharp-shinned Hawk	SC	0.09	0.07	-	0.11
Cooper's Hawk	SC	0.06	0.07	-	0.06
Red-shouldered Hawk	SC	0.20	-	0.13	0.06
Broad-winged Hawk		0.11	-	0.10	-
Red-tailed Hawk		0.54	0.97	0.48	1.42
American Kestrel		0.91	2.34	1.35	0.78
Sora		-	-	-	0.03
Common Moorhen		-	-	-	0.14
American Coot		-	-	-	0.06
Killdeer		9.26	15.31	5.81	12.67
Spotted Sandpiper		0.14	0.17	0.23	0.17
Upland Sandpiper	T	0.89	1.93	0.10	-
Wilson's Snipe		0.60	0.76	-	0.17
American Woodcock		0.06	0.03	-	-
Ring-billed Gull		8.74	0.28	-	5.06
Herring Gull		-	0.03	-	-
Rock Pigeon		21.37	38.45	10.19	43.25
Mourning Dove		12.77	22.79	15.45	28.00
Black-billed Cuckoo		0.31	0.72	0.52	0.47
Yellow-billed Cuckoo		0.06	0.34	0.19	0.36
Eastern Screech-Owl		-	-	0.06	-
Great Horned Owl		-	0.17	-	0.19
Barred Owl		0.03	-	-	-
Common Nighthawk	SC	-	-	0.03	-
Chimney Swift		3.06	0.76	5.03	3.31
Ruby-throated Hummingbird		0.17	0.21	0.61	0.36

Table E-2 Bird Species Recorded During East Java, Gainesville, Centerville, and Castile Breeding Bird Surveys

Common Name	Listed Species	Birds per Route			
		East Java	Gainesville	Centerville	Castile
Belted Kingfisher		0.06	0.41	0.81	0.50
Red-headed Woodpecker	SC	0.03	0.17	0.03	0.33
Red-bellied Woodpecker		0.03	0.14	0.10	1.06
Yellow-bellied Sapsucker		0.23	0.86	0.06	0.64
Downy Woodpecker		1.11	1.52	2.06	2.06
Hairy Woodpecker		0.03	0.21	0.13	0.19
Northern Flicker		1.71	2.93	2.74	3.11
Pileated Woodpecker		0.17	0.10	0.06	0.33
Eastern Wood-Pewee		1.20	2.34	1.68	2.78
Alder Flycatcher		0.37	1.14	0.94	0.61
Willow Flycatcher		3.86	6.07	1.65	5.64
Least Flycatcher		1.80	3.93	3.87	3.67
Eastern Phoebe		1.31	2.31	4.52	2.14
Great Crested Flycatcher		1.49	1.00	1.58	2.72
Eastern Kingbird		3.94	3.52	4.03	6.08
Yellow-throated Vireo		-	0.03	0.03	-
Blue-headed Vireo		0.09	-	-	-
Warbling Vireo		1.29	4.07	3.52	4.42
Red-eyed Vireo		7.43	5.97	7.39	4.31
Blue Jay		5.63	2.93	8.35	4.17
American Crow		46.17	54.17	48.74	56.67
Common Raven		-	-	0.19	-
Horned Lark	SC	0.83	5.03	1.26	9.42
Purple Martin		0.49	-	0.45	0.14
Tree Swallow		6.37	4.72	4.52	4.89
Northern Rough-winged Swallow		0.40	1.31	0.77	0.11
Bank Swallow		0.17	2.07	0.61	1.22
Cliff Swallow		0.11	0.10	0.23	-
Barn Swallow		23.94	28.14	32.90	20.11
Black-capped Chickadee		6.43	2.59	8.65	3.78
Tufted Titmouse		-	0.03	0.10	0.22
Red-breasted Nuthatch		0.11	0.03	0.13	-
White-breasted Nuthatch		0.49	0.86	1.10	0.42
Brown Creeper		0.14	-	0.06	-
Carolina Wren		-	-	0.13	0.03
House Wren		7.29	12.66	13.13	11.42
Blue-gray Gnatcatcher		-	0.03	-	-
Eastern Bluebird		1.09	0.34	1.58	1.03
Veery		2.43	0.59	1.61	1.47
Hermit Thrush		0.14	-	0.03	-
Wood Thrush		4.63	5.24	3.29	5.75
American Robin		58.40	70.97	90.81	93.81

Table E-2 Bird Species Recorded During East Java, Gainesville, Centerville, and Castile Breeding Bird Surveys

Common Name	Listed Species	Birds per Route			
		East Java	Gainesville	Centerville	Castile
Gray Catbird		5.77	9.24	9.06	10.11
Northern Mockingbird		-	0.03	-	0.22
Brown Thrasher		0.69	0.62	1.10	0.56
European Starling		97.57	168.14	121.90	211.31
Cedar Waxwing		7.71	10.79	7.61	15.17
Blue-winged Warbler		0.46	0.21	1.65	0.25
Golden-winged Warbler	SC	-	-	-	0.03
Nashville Warbler		-	0.03	0.03	-
Yellow Warbler		9.46	23.83	19.32	22.69
Chestnut-sided Warbler		1.49	0.72	2.55	1.50
Magnolia Warbler		0.14	-	0.19	0.03
Black-throated Blue Warbler		0.03	-	-	-
Yellow-rumped Warbler		0.06	-	0.19	-
Black-throated Green Warbler		1.11	0.03	0.06	-
Blackburnian Warbler		0.26	-	-	-
Pine Warbler		-	-	0.03	-
Prairie Warbler		0.06	-	0.29	-
Black-and-white Warbler		0.03	-	-	-
American Redstart		0.20	0.28	0.35	0.81
Ovenbird		2.54	0.14	1.32	0.19
Northern Waterthrush		0.20	0.03	-	-
Louisiana Waterthrush		-	-	0.10	0.03
Mourning Warbler		1.00	0.59	0.45	0.64
Common Yellowthroat		11.17	16.97	16.97	11.11
Hooded Warbler		0.37	0.14	0.39	0.58
Canada Warbler		0.11	-	-	-
Scarlet Tanager		1.03	0.62	0.65	0.97
Eastern Towhee		1.66	0.90	2.81	1.19
Chipping Sparrow		21.06	22.03	20.16	33.72
Field Sparrow		5.00	5.17	11.23	4.42
Vesper Sparrow	SC	0.20	4.69	0.52	4.36
Savannah Sparrow		19.94	47.34	11.35	32.64
Grasshopper Sparrow	SC	0.40	1.48	0.39	0.19
Henslow's Sparrow	T	0.23	0.24	0.13	-
Song Sparrow		33.29	55.14	41.13	64.39
Swamp Sparrow		0.80	0.59	0.06	0.97
White-throated Sparrow		0.11	-	-	0.03
Dark-eyed Junco		1.63	0.07	0.97	0.03
Northern Cardinal		3.69	4.03	6.74	6.17
Rose-breasted Grosbeak		1.77	3.17	1.71	3.50
Indigo Bunting		4.06	5.21	8.68	5.28

Table E-2 Bird Species Recorded During East Java, Gainesville, Centerville, and Castile Breeding Bird Surveys

Common Name	Listed Species	Birds per Route			
		East Java	Gainesville	Centerville	Castile
Bobolink		30.00	27.14	33.35	20.53
Red-winged Blackbird		114.37	155.48	122.87	176.42
Eastern Meadowlark		16.57	25.97	19.00	13.86
Western Meadowlark		-	0.03	-	-
Common Grackle		71.66	76.24	50.87	103.00
Brown-headed Cowbird		13.14	9.52	5.26	17.56
Orchard Oriole		-	-	0.06	-
Baltimore Oriole		4.77	6.93	6.55	8.00
Purple Finch		2.11	0.21	0.48	0.25
House Finch		2.49	2.38	3.90	5.36
Pine Siskin		-	0.03	-	-
American Goldfinch		16.11	28.83	22.39	35.44
House Sparrow		30.17	55.66	39.90	90.06

Source: Sauer et al. 2005.

Key:

- E = Endangered
- SC = Special Concern
- T = Threatened

Table E-3 Species Recorded During the Last 10 Years of the Beaver Meadow Christmas Bird Count (1996-2005)

Common Name	Listed Species	Year										Grand Total
		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Snow Goose		-	-	-	-	-	-	-	-	7	-	7
Canada Goose		-	47	3	28	441	1	1,068	2	81	6	1,677
Tundra Swan		-	20	-	-	-	-	-	-	-	-	20
American Black Duck		-	-	-	-	4	-	-	-	2	-	6
Mallard		3	4	29	52	47	21	68	43	14	18	299
Hooded Merganser		-	0	-	-	-	-	1	-	-	-	1
Ring-necked Pheasant		2	-	2	5	-	1	1	3	-	5	19
Ruffed Grouse		1	5	4	2	-	2	2	2	5	-	23
Wild Turkey		244	15	29	110	42	43	121	85	87	103	879
Great Blue Heron		3	3	2	-	3	1	1	1	30	3	47
Northern Harrier	T	-	-	-	2	1	-	2	-	-	-	5
Sharp-shinned Hawk	SC	4	4	7	1	4	4	2	3	6	1	36
Cooper's Hawk	SC	1	4	4	5	8	-	7	-	7	6	42
Northern Goshawk	SC	0	-	-	-	-	-	-	-	1	1	2
Red-shouldered Hawk	SC	-	-	-	-	-	-	-	-	1	3	4
Red-tailed Hawk		23	31	43	49	59	37	32	7	21	56	358
Rough-legged Hawk		1	-	-	2	2	4	2	-	3	4	18
American Kestrel		2	3	2	5	8	3	3	-	-	-	26
Killdeer		-	-	-	-	-	-	-	-	1	-	1
Ring-billed Gull		-	4	4	19	-	1	285	-	3	-	316
Herring Gull		3	-	-	-	3	4	21	-	2	4	37
Rock Pigeon		619	754	611	269	644	526	1,074	278	654	728	6,157
Mourning Dove		149	268	265	270	894	212	464	134	497	252	3,405
Eastern Screech-Owl		5	2	5	5	11	2	2	3	4	7	46
Great Horned Owl		6	1	2	3	1	2	-	-	1	2	18
Snowy Owl		1	-	1	-	-	-	-	-	-	-	2
Barred Owl		3	2	1	-	-	-	-	-	-	-	6
Short-eared Owl	E	2	-	-	2	2	-	-	-	3	-	9
Belted Kingfisher		-	-	-	1	1	-	1	-	1	-	4
Red-bellied Woodpecker		7	4	4	8	6	4	14	4	22	28	101

Table E-3 Species Recorded During the Last 10 Years of the Beaver Meadow Christmas Bird Count (1996-2005)

Common Name	Listed Species	Year										Grand Total
		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Yellow-bellied Sapsucker		1	-	-	-	-	-	-	-	-	-	1
Downy Woodpecker		80	66	42	48	56	19	66	29	69	87	562
Hairy Woodpecker		20	11	16	17	18	8	22	11	23	24	170
Northern Flicker		3	2	3	1	8	1	5	-	2	-	25
Pileated Woodpecker		5	-	1	5	3	1	4	2	3	2	26
Eastern Phoebe		0	-	-	-	-	-	-	-	-	-	0
Northern Shrike		4	3	3	4	12	4	3	1	1	5	40
Blue Jay		162	278	144	306	314	344	153	199	352	275	2,527
American Crow		898	1,020	510	1,224	990	793	808	381	1,637	940	9,201
Common Raven		2	-	-	-	-	-	-	-	-	-	2
Horned Lark	SC	172	72	40	180	179	249	266	-	198	1	1,357
Black-capped Chickadee		752	600	717	582	659	324	425	430	527	542	5,558
Tufted Titmouse		20	8	8	4	7	5	18	7	38	34	149
Red-breasted Nuthatch		15	11	10	7	9	7	15	7	22	9	112
White-breasted Nuthatch		37	45	47	28	25	13	39	18	28	52	332
Brown Creeper		8	5	2	2	1	4	5	6	6	1	40
Carolina Wren		-	-	-	-	-	1	-	-	-	-	1
Golden-crowned Kinglet		9	9	7	20	3	19	19	12	6	4	108
Ruby-crowned Kinglet		-	-	-	-	-	-	1	-	-	-	1
Eastern Bluebird		-	2	-	-	23	3	-	2	-	-	30
American Robin		-	2	-	3	68	1	1	2	5	8	90
Gray Catbird		-	-	-	-	-	-	-	1	-	-	1
European Starling		2,299	1,147	2,913	1,556	2,672	1,544	4,197	387	1,286	3,858	21,859
American Pipit		-	-	-	-	1	-	-	-	-	-	1
Cedar Waxwing		2	20	258	26	62	82	167	74	50	14	755
American Tree Sparrow		137	342	167	575	499	166	159	208	458	401	3,112
Chipping Sparrow		-	-	1	-	-	-	-	-	-	-	1

Table E-3 Species Recorded During the Last 10 Years of the Beaver Meadow Christmas Bird Count (1996-2005)

Common Name	Listed Species	Year										Grand Total
		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	
Song Sparrow		3	7	4	9	3	1	2	3	5	6	43
Swamp Sparrow		-	-	-	1	-	-	-	-	1	-	2
White-throated Sparrow		3	15	3	6	3	3	9	16	19	12	89
White-crowned Sparrow		-	-	-	-	-	-	-	-	1	-	1
Dark-eyed Junco		155	651	227	515	477	300	272	325	501	591	4,014
Lapland Longspur		3	-	-	-	-	-	-	-	-	-	3
Snow Bunting		1,445	225	-	182	37	171	102	-	10	233	2,405
Northern Cardinal		91	51	67	71	43	40	55	86	53	117	674
Red-winged Blackbird		-	-	-	-	1	1	1	1	-	-	4
Eastern Meadowlark		1	-	-	-	-	-	-	-	-	-	1
Rusty Blackbird		-	-	-	-	1	-	-	-	-	-	1
Common Grackle		-	1	-	1	1	-	-	-	-	-	3
Brown-headed Cowbird		-	-	6	1	53	20	2	-	1	30	113
Pine Grosbeak		-	-	-	-	-	-	1	-	-	-	1
Purple Finch		-	1	2	-	7	9	2	-	-	25	46
House Finch		141	166	153	190	148	110	231	118	207	98	1,562
Common Redpoll		5	-	-	-	185	-	128	-	-	-	318
Pine Siskin		-	-	1	-	-	1	3	1	-	-	6
American Goldfinch		19	104	48	116	113	93	226	123	719	198	1,759
Evening Grosbeak		130	-	130	-	102	-	4	-	-	-	366
House Sparrow		539	434	333	402	359	459	390	134	225	519	3,794
Grand Total		8,240	6,469	6,881	6,920	9,323	5,664	10,972	3,149	7,906	9,313	74,837
Species Total		52	46	47	48	54	49	54	39	52	44	78

Source: National Audubon Society 2005

Key:

- E = Endangered.
- SC = Special Concern.
- T = Threatened.

F

E & E Bird Survey Tables

Table F-1
Wethersfield Project Area
Spring Migratory Bird Survey by Date

Species	5/10/2006	5/17/2006	Total
Canada Goose	30	52	82
Wood Duck	2	5	7
Mallard	14	6	20
Ring-necked Pheasant	3	3	6
Wild Turkey	5	4	9
Green Heron	2	0	2
Turkey Vulture	1	1	2
Northern Harrier	0	1	1
Sharp-shinned Hawk	1	0	1
Red-tailed Hawk	6	5	11
Killdeer	7	3	10
Ring-billed Gull	2	0	2
Mourning Dove	10	9	19
Yellow-bellied Sapsucker	8	2	10
Downy Woodpecker	2	1	3
Hairy Woodpecker	1	0	1
Northern Flicker	4	2	6
Eastern Wood-Pewee	1	0	1
Least Flycatcher	1	0	1
Great Crested Flycatcher	1	0	1
Eastern Kingbird	5	7	12
Blue-headed Vireo	1	0	1
Red-eyed Vireo	0	2	2
Blue Jay	10	4	14
American Crow	57	76	133
Common Raven	1	0	1
Horned Lark	8	0	8
Tree Swallow	19	8	27
N Rough-winged Swallow	3	1	4
Cliff Swallow	0	2	2
Barn Swallow	17	10	27
Black-capped Chickadee	8	3	11
Tufted Titmouse	4	2	6
Golden-crowned Kinglet	2	0	2
Ruby-crowned Kinglet	1	0	1
Eastern Bluebird	4	0	4
Veery	1	0	1
Wood Thrush	0	2	2
American Robin	59	48	107
Gray Catbird	3	5	8
Brown Thrasher	1	2	3
Tennessee Warbler	2	0	2
Nashville Warbler	4	0	4
Yellow Warbler	9	13	22
Chestnut-sided Warbler	1	19	20
Magnolia Warbler	2	2	4
Yellow-rumped Warbler	11	1	12
Ovenbird	2	1	3
Mourning Warbler	0	2	2
Common Yellowthroat	3	10	13
Eastern Towhee	1	0	1
Chipping Sparrow	13	13	26
Field Sparrow	1	0	1
Savannah Sparrow	23	10	33
Song Sparrow	17	19	36
Northern Cardinal	4	4	8
Rose-breasted Grosbeak	6	2	8

Species	5/10/2006	5/17/2006	Total
Indigo Bunting	0	1	1
Bobolink	59	57	116
Red-winged Blackbird	129	127	256
Eastern Meadowlark	1	0	1
Common Grackle	30	27	57
Brown-headed Cowbird	9	4	13
Baltimore Oriole	5	5	10
Purple Finch	3	0	3
House Finch	1	2	3
American Goldfinch	39	26	65
Total Birds:	680	611	1291
Species Count:	61	47	
Total Species:	67		

Table F-2

Wethersfiled Project Area
Spring Migratory Bird Survey by Location

Totals From Two Surveys

Species	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Total
Canada Goose	2	4	6	3	19	4	0	1	1	0	4	0	2	2	0	2	2	0	4	2	21	0	2	1	82
Wood Duck	0	0	0	0	0	0	0	1	5	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	7
Mallard	0	0	4	0	2	0	2	4	3	0	0	0	3	0	2	0	0	0	0	0	0	0	0	0	20
Ring-necked Pheasant	0	3	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	6
Wild Turkey	4	0	0	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	9
Green Heron	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2
Turkey Vulture	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
Northern Harrier	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Sharp-shinned Hawk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Red-tailed Hawk	1	0	0	1	1	0	0	2	0	0	0	0	2	0	0	0	0	0	1	0	3	0	0	0	11
Killdeer	1	0	0	0	2	1	0	0	0	0	0	1	2	0	0	0	0	3	0	0	0	0	0	0	10
Ring-billed Gull	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2
Mourning Dove	3	1	3	1	0	1	0	1	0	0	2	0	3	0	0	1	0	1	0	0	0	1	0	1	19
Yellow-bellied Sapsucker	1	0	1	2	0	1	0	1	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1	0	10
Downy Woodpecker	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3
Hairy Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Northern Flicker	0	0	0	1	1	2	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	6
Eastern Wood-Pewee	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Least Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Great Crested Flycatcher	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Eastern Kingbird	0	0	0	0	0	2	0	2	0	1	0	0	0	0	0	0	2	0	0	0	5	0	0	0	12
Blue-headed Vireo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Red-eyed Vireo	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	2
Blue Jay	0	0	0	0	2	0	2	0	4	0	0	0	0	0	0	0	0	0	1	1	2	0	0	2	14
American Crow	3	2	8	8	3	8	4	7	13	6	5	5	9	4	4	3	6	7	7	11	3	1	5	1	133
Common Raven	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Horned Lark	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Tree Swallow	0	0	0	0	4	0	0	4	2	0	4	0	4	1	1	1	3	0	0	2	0	0	0	1	27
N Rough-winged Swallow	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Cliff Swallow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2
Barn Swallow	0	0	0	0	2	1	0	0	0	0	0	0	15	0	0	0	2	2	3	2	0	0	0	0	27
Black-capped Chickadee	1	0	0	0	0	0	1	1	0	1	2	2	0	0	0	1	0	0	0	0	0	0	0	2	11
Tufted Titmouse	0	0	0	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	2	0	0	6
Golden-crowned Kinglet	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Ruby-crowned Kinglet	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Eastern Bluebird	0	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4
Veery	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Wood Thrush	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2
American Robin	5	5	7	6	6	8	4	6	4	3	0	5	4	3	7	4	3	7	4	3	2	1	6	4	107
Gray Catbird	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	8
Brown Thrasher	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3
Tennessee Warbler	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	2
Nashville Warbler	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4
Yellow Warbler	4	0	0	1	1	0	1	3	1	1	0	1	0	0	0	0	0	1	3	0	2	1	0	2	22
Chestnut-sided Warbler	1	0	0	0	2	1	1	1	0	1	0	0	0	0	1	2	0	0	1	2	0	2	4	1	20
Magnolia Warbler	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Yellow-rumped Warbler	2	0	0	0	3	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	3	0	12
Ovenbird	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	3
Mourning Warbler	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
Common Yellowthroat	0	0	0	0	1	0	3	3	1	0	0	0	0	0	0	0	0	1	1	0	2	0	0	1	13
Eastern Towhee	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Chipping Sparrow	2	2	0	0	3	3	0	0	1	0	0	0	1	0	3	3	0	0	1	1	5	0	0	1	26

Species	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Total
Field Sparrow	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Savannah Sparrow	1	3	1	2	2	1	0	1	0	1	2	1	1	3	3	2	0	1	2	2	2	0	1	1	33
Song Sparrow	1	0	1	0	4	2	3	3	2	2	0	1	2	2	5	0	0	0	3	2	1	0	1	1	36
Northern Cardinal	3	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	8
Rose-breasted Grosbeak	1	0	0	1	0	0	0	1	0	1	0	0	1	0	0	1	0	0	1	0	1	0	0	0	8
Indigo Bunting	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Bobolink	3	4	3	2	1	2	2	4	5	4	22	5	24	18	0	0	6	5	6	0	0	0	0	0	116
Red-winged Blackbird	8	13	11	24	18	14	11	13	13	4	24	2	17	26	1	1	9	12	26	3	4	0	2	0	256
Eastern Meadowlark	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Common Grackle	0	5	6	4	3	0	5	2	5	0	0	3	5	3	4	2	0	6	2	1	0	0	1	0	57
Brown-headed Cowbird	0	0	0	0	0	0	0	0	2	0	5	1	0	0	1	3	0	0	0	0	0	0	0	1	13
Baltimore Oriole	1	0	0	0	0	0	2	2	0	0	0	0	0	0	2	1	0	0	1	0	1	0	0	0	10
Purple Finch	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3
House Finch	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3
American Goldfinch	10	0	1	1	5	6	0	1	1	1	0	6	1	1	9	0	0	4	4	1	6	2	1	4	65
Total Birds:	63	45	56	62	98	57	44	71	66	29	79	36+02	66	48	28	36	54	74	36	66	16	29	28	1291	
Species Count:	25	12	16	18	30	16	16	29	19	13	11	15	24	13	17	15	10	16	21	16	19	11	13	19	
Total Species:	67																								

Table F-3

**Wethersfield Project Area
Breeding Bird Survey by Date**

Species	6/05/2006	6/22/2006	Total
Canada Goose	12	0	12
Ring-necked Pheasant	1	0	1
Broad-winged Hawk	1	0	1
Killdeer	1	1	2
Ring-billed Gull	0	2	2
Mourning Dove	0	1	1
Red-bellied Woodpecker	1	0	1
Yellow-bellied Sapsucker	0	3	3
Hairy Woodpecker	1	0	1
Northern Flicker	1	1	2
Eastern Wood-Pewee	2	1	3
Alder Flycatcher	4	0	4
Least Flycatcher	1	1	2
Eastern Phoebe	2	0	2
Great Crested Flycatcher	2	0	2
Eastern Kingbird	1	4	5
Warbling Vireo	1	0	1
Red-eyed Vireo	13	6	19
Blue Jay	0	1	1
American Crow	12	19	31
Barn Swallow	4	2	6
Black-capped Chickadee	2	2	4
White-breasted Nuthatch	1	1	2
House Wren	1	1	2
Veery	4	3	7
Hermit Thrush	1	0	1
Wood Thrush	3	1	4
American Robin	15	9	24
Gray Catbird	2	1	3
Cedar Waxwing	12	11	23
Blue-winged Warbler	1	1	2
Yellow Warbler	12	1	13
Chestnut-sided Warbler	4	3	7
Black-throated Blue Warbler	1	0	1
Black-thr. Green Warbler	3	1	4
American Redstart	2	2	4
Ovenbird	5	3	8
Mourning Warbler	1	1	2
Common Yellowthroat	5	3	8
Hooded Warbler	1	2	3
Scarlet Tanager	1	1	2
Eastern Towhee	3	2	5
Chipping Sparrow	1	1	2
Field Sparrow	1	2	3
Savannah Sparrow	9	23	32
Song Sparrow	18	18	36
Dark-eyed Junco	0	1	1
Indigo Bunting	2	2	4
Bobolink	22	26	48
Red-winged Blackbird	13	24	37
Eastern Meadowlark	0	1	1
Common Grackle	2	2	4
Brown-headed Cowbird	3	0	3
American Goldfinch	4	2	6

Species	6/05/2006	6/22/2006	Total
Total Birds:	215	193	408
Species Count:	48	42	
Total Species:	54		

Table F-4
Wethersfield Project Area
Breeding Bird Survey by Location

Species	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Total
Canada Goose	0	0	0	0	0	0	0	0	8	0	4	0	0	0	0	12
Ring-necked Pheasant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Broad-winged Hawk	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Killdeer	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
Ring-billed Gull	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
Mourning Dove	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Red-bellied Woodpecker	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Yellow-bellied Sapsucker	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0	3
Hairy Woodpecker	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Northern Flicker	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	2
Eastern Wood-Pewee	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	3
Alder Flycatcher	0	1	0	0	2	0	0	0	1	0	0	0	0	0	0	4
Least Flycatcher	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2
Eastern Phoebe	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2
Great Crested Flycatcher	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	2
Eastern Kingbird	0	0	2	0	0	0	0	0	1	0	1	1	0	0	0	5
Warbling Vireo	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Red-eyed Vireo	1	1	3	0	0	4	2	1	0	1	2	0	2	2	0	19
Blue Jay	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
American Crow	0	1	3	0	1	3	2	0	11	1	1	0	2	1	5	31
Barn Swallow	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	6
Black-capped Chickadee	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	4
White-breasted Nuthatch	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	2
House Wren	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2
Veery	0	0	1	0	2	2	0	0	0	0	2	0	0	0	0	7
Hermit Thrush	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Wood Thrush	0	1	0	0	2	0	0	1	0	0	0	0	0	0	0	4
American Robin	0	5	5	0	0	3	1	0	2	6	2	0	0	0	0	24
Gray Catbird	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	3
Cedar Waxwing	0	0	5	4	6	0	0	0	2	0	0	0	4	0	2	23
Blue-winged Warbler	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	2
Yellow Warbler	4	1	0	0	3	0	0	0	2	0	2	0	1	0	0	13
Chestnut-sided Warbler	0	2	0	0	0	0	0	0	0	1	3	0	1	0	0	7
Black-throated Blue Warbler	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Black-thr. Green Warbler	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	4
American Redstart	0	0	1	0	0	0	0	0	0	3	0	0	0	0	0	4
Ovenbird	0	0	1	0	2	0	0	2	0	2	0	0	0	1	0	8
Mourning Warbler	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Common Yellowthroat	2	1	0	0	2	0	0	0	0	0	2	0	0	0	1	8
Hooded Warbler	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	3
Scarlet Tanager	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	2
Eastern Towhee	0	3	0	0	1	0	0	0	0	0	1	0	0	0	0	5
Chipping Sparrow	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	2
Field Sparrow	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3
Savannah Sparrow	3	1	0	1	0	0	8	0	5	1	0	7	6	0	0	32
Song Sparrow	3	5	4	3	3	0	0	0	3	0	6	3	0	1	5	36
Dark-eyed Junco	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
Indigo Bunting	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2	4
Bobolink	1	4	0	3	0	0	10	0	7	1	0	10	9	0	3	48
Red-winged Blackbird	3	0	3	5	0	0	11	0	6	1	0	0	2	0	6	37
Eastern Meadowlark	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Common Grackle	0	1	0	0	0	0	0	0	0	0	0	0	2	0	1	4



Work Plan for Post-construction Bird and Bat Mortality Monitoring

**Work Plan for Bird and Bat
Post-construction Studies
at the Wethersfield Windpark
Towns of Wethersfield and Eagle,
Wyoming County, New York**

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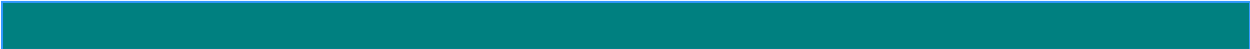
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List of Abbreviations and Acronyms

asl	above sea level
DEIS	Draft Environmental Impact Statement
E & E	Ecology and Environment, Inc.
FAA	Federal Aviation Administration
GE	General Electric
kW	kilowatt
MTS	Modular Tower System
MW	megawatt
Noble	Noble Environmental Power, LLC
NWS	National Weather Service
NYSDEC	New York State Department of Environmental Conservation
ROW	right-of-way
USACE	United States Army Corps of Engineers

1

Project Background and Study Area

1.1 Project Overview and Definitions

Noble Environmental Power, LLC (Noble) proposes to install and operate a wind energy facility (Project) in the Towns of Wethersfield and Eagle, Wyoming County, located in western New York State (see Figure 1-1).

The Project consists of the following:

- Installation and operation of 85 wind turbines with a capacity of 127.5 megawatts (MW) within an approximate 9,151-acre area in the Towns of Wethersfield and Eagle (Windpark) (see Figure 1-2);
- Construction and use of approximately 20 miles of access roads that will connect each wind turbine to a Town or County roadway to allow equipment and vehicle access for construction and subsequent maintenance of the facilities; and
- Construction and use of an electrical collection system that will allow delivery of electricity to a new substation to be constructed in the Town of Wethersfield as part of the transmission portion of the Project. Where practical, the electrical collection system will be installed underground along the same right-of-way (ROW) corridor as the access roads.

1.2 Turbine Description

The wind turbines that will be installed at the Windpark will be General Electric (GE) 1.5-MW, Model sle, 80-meter, Modular Tower System (MTS), T-Flange wind turbine generators¹. The turbine is a three-bladed, upwind, horizontal-axis wind turbine with a rotor diameter of 253 feet (77 meters; see Figure 1-2). The nacelle is located at the top of each tower and contains the electrical generating equipment. The turbine rotor and nacelle are mounted on top of a tubular tower,

¹ 1.5-MW refers to the production capacity of the turbine, which is 1.5 megawatts. The nomenclature “sle” is used to designate that the diameter size of the turbine rotor is 77 meters. 80-meter refers to the height of the tower. MTS (Modular Tower System) designates the type of tower configuration, and T-Flange designates the type of flange used to connect the tower directly to the foundation.

1. Project Background and Study Area

giving a rotor hub height of 263 feet (80 meters) (see Figure 1-3). The maximum height for the turbine is 389 feet (118.5 meters) when a rotor blade is at the top of its rotation. Once installed, each wind turbine will occupy a round, slightly exposed base approximately 18 feet in diameter.

Section 1.3 of the Draft Environmental Impact Statement (DEIS) describes the process used to select turbine site locations. A number of factors, including proximity to wetlands were evaluated in determining where to locate turbines. A specific discussion of impacts to wetlands is found in Section 2.8 of the DEIS. The proposed turbine sites represent a balancing of the site selection criteria.

1.3 Permitting Requirements

This work plan for bird and bat post-construction mortality studies was prepared by Ecology and Environment, Inc. (E & E) to address anticipated requirements that will be incorporated into the New York State Department of Environmental Conservation (NYSDEC), Article 15 and Article 24 permitting and United States Army Corps of Engineers (USACE) Section 404 and Section 10 permitting for the Project. It should be noted that NYSDEC is likely to require an overarching adaptive management strategy for evaluating actual impacts associated with the operation of the Project. As such, the methodology as outlined here, is a pilot study of methods to be used in subsequent years of post-construction studies. The scope may be revised to either increase the scope of the study, or reduce scope based upon the number of carcasses retrieved in relation to the actual number of hours/days searched, weather conditions, carcass removal rates, searcher efficiencies, or other parameters viewed as relevant following yearly review of the data.

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Study Objectives

Given the concern for bird and bat resources associated with wind energy facilities, quantifying the direct collisions with turbines is the key component of the studies. The studies are a compliment to preconstruction radar studies and field surveys that were conducted in the spring and fall of 2006 and are designed to quantify the bird and bat collision impacts from the Wethersfield Windpark during migratory periods (E & E 2006).

The objectives for the proposed plan of study are to:

- Collect quantitative collision data on birds and bats from the Wethersfield Windpark during migratory seasons. Estimates of numbers of fatalities will be determined for both bird and bats, both collectively, and on a species-by-species basis;
- Collect information on the occurrence of bat species in the Project Area during migratory seasons; and
- Evaluate the data and identify potential adaptive management strategies if collision impacts are significant.

3

Methodology

To date, there is no consensus regarding methodologies for post-construction mortality monitoring studies at windparks, nor are there any formally accepted practices. Noble anticipates that NYSDEC will issue more defined guidance for post-construction monitoring requirements to standardize sampling between the various projects that are under construction or being proposed within the State. While the guidance has not yet been published, it is Noble's understanding that the guidance will be made available early in 2007, and as such, will be able to modify approaches, as appropriate, prior to the Wethersfield Windpark's operation. The methodologies proposed by Noble follow standard procedures currently used at communication towers and that have been applied to wind turbines in various locations in the United States. Noble has also integrated comments from ongoing discussions with NYSDEC bird and bat biologists.

Task 1: Post-construction Bird and Bat Mortality Study

This post-construction study will estimate the magnitude of bird and bat collisions associated with the Wethersfield Windpark based on field surveys and statistical extrapolation. The study will be conducted over three successive years and focus on the migration periods for birds and bats. The results of this study will be useful to determine the collision impacts to migratory birds and bats and identify if the results are comparable with the estimated mortality rates included in the DEIS for this Project.

Study Area. When constructed, the Wethersfield Windpark will consist of 85 1.5-MW turbines within an approximate 9,151-acre area in the Towns of Wethersfield and Eagle, Wyoming County. The turbines will be distributed in loose clusters throughout the Project Area. The surface elevation of the Project Area approximately 2,070 feet above sea level (asl) with a total turbine height, from ground surface to full rotor blade extension, of approximately 389 feet. The Windpark will be lighted in accordance with Federal Aviation Administration (FAA) guidelines. No guy wires will be associated with the turbines, and there are also no locations suitable for perching or nesting by birds on the turbines. Access roads will connect to each turbine, allowing for vehicular access to conduct this study.

Search Area. Previous mortality studies at wind projects indicate that most fatalities are typically found within half the maximum distance from the tip height to the ground (Erickson and Kerns 2005). With a tip height of approximately 389 feet (118.5 meters), direct visual observations will be conducted within a 394-foot (120-meter) diameter plot from the turbine. The search area will be further separated into survey transect lines at 33-foot (10-meter) intervals, with 12 transects sited for each turbine surveyed. The transects will be located using a global positioning system and/or in field flagging to assure consistency between searchers and turbine sites.

Searches will be conducted at approximately one third of the total turbines. Therefore, 29 turbines will be searched for this study at the Wethersfield Windpark. Although the turbines to be searched would be selected randomly, the selection process will involve stratification by habitat. In other words, all habitats present (hayfield/grassland, brushland, forestland, and proximity to wetland complexes) would be represented so that differences in fatality rates among habitats could be evaluated via statistical analysis following data collection.

Search Interval. Based on discussions with NYSDEC, as well as on information generally available for other wind projects, Noble proposes to further divide the 29 turbines into three subsets. Daily searches will be conducted at 10 turbines, searches would be conducted twice a week (every third day) at 10 turbines, and the remaining nine turbines would be searched weekly. Adjustments may be necessary due to severe weather.

Although largely dependent on weather, Noble proposes that search efforts will extend from April 15 through October 15. Winter bird use of the Project Site is comparatively low and risk is considered minimal during this season. Although bird migration begins in late March, and can extend into November, the proposed time frame encompasses the peak of spring and fall passerine migration as well as the entire breeding season. Based on preliminary data collected at other constructed wind projects, much of the mortality that is noted is bat mortality and it occurs as specific events throughout the summer. Therefore, while bird mortalities would be associated primarily with spring and fall migration, the impacts to bats, specifically tree roosting species, will require mortality monitoring throughout the summer.

Prior to initiating the annual survey effort, each of the 29 turbine sites will be searched to locate residual carcasses that may have accumulated since the Project began operation.

Field Search Methodology. Each field surveyor will be trained in the search protocol in advance of his or her first fatality search. The 12 transect lines within each search area will be slowly walked, with surveys conducted by a team of two biologists. A search time of approximately 30 to 45 minutes per turbine is anticipated, although the time will vary based on habitat and terrain. Field modification

of transect lines may be necessary to avoid unwalkable areas (e.g., dense forest, pit, steep slope). Prior to the commencement of sampling, the search areas beneath turbines (except forested areas) would be cleared of vegetation to facilitate the searchers' efforts. Except in agricultural areas, additional clearing would occur at monthly intervals throughout the duration of monitoring year.

All carcass observations, which may include feathers or portions thereof, will be mapped on a data sheet as to its location relative to specific transect lines. Additional information to be collected shall include the date; time; observer; identification of bird or bat species; if the carcass was intact or scavenged; if there were feather spots; as well as photographic documentation of the carcass and its location. Daily searches will commence near sunrise and proceed until all searches for the day are completed. Searches will be temporarily delayed if severe weather or safety conditions occur.

Identification of Carcasses. Any bird carcasses observed during the survey effort will be left undisturbed for use in the scavenging loss analysis. In the case of bat carcasses, final (confirmatory) identification would be by an expert (e.g., Al Hicks, NYSDEC). Based on discussions, all bat carcasses are to be collected and forwarded to NYSDEC for identification and storage. Noble will continue to coordinate with NYSDEC regarding possible on-site storage of certain bat carcasses and use for scavenging and efficiency trials.

Each carcass will be mapped on a data sheet in reference to its distance and bearing from the specific turbine. Photographic documentation will be collected of each observation. The field surveyor will attempt to identify each carcass to species. The photographic documentation will be reviewed to confirm the proper identification.

NYSDEC has requested that specific carcasses be submitted for stable radioisotope analysis to determine genetic diversity within local bat populations and possible the origin of individual bats. Based on recent information collected at the National Wind Coordinating Committee's annual meeting, Dr. Nancy Simmons, with the American Museum of Natural Science, will undertake a nationwide genetic analysis of tree-roosting bats to assess the genetic/population stability of these species. To support this effort, Noble will commit to submitting approximately 10 specimens of the following species per year toward this effort: Hoary Bat (*Lasiurus cinereus*), Eastern Red Bat (*L. borealis*), and Silver-haired Bat (*Lasionycteris noctivagans*). Final details of this portion of the carcass analysis, specifically collection protocols and cost, will be coordinated with NYSDEC.

Weather. Weather conditions from the night prior to each survey day will be collected from local sources and supplemented by National Weather Service (NWS) data. During each morning's carcass search, weather observations will be documented on all data sheets and will include, at a minimum, cloud cover, temperature, and wind direction and speed. Night visibility will be characterized by esti-

imating the percent of cloud cover to the nearest quarter percent and by recording the presence or absence of fog. Additionally, precipitation records will also be gathered from NWS data sources.

Scavenging Loss Estimations. The proportion of bird and bat carcasses removed from the search area by other wildlife (scavengers) will be estimated based on the information collected. The number of days until scavenging removal occurs will be tracked for each bird and bat carcass found in the search area. The degree of scavenging prior to carcass removal will be documented during each search.

Additional carcasses will occasionally be placed at random locations within the search area based on bird and bat carcass availability. Placement of these “test carcasses” will be used primarily to determine searcher efficiency, but they will also be tracked for scavenging loss. Test carcasses will be those found from other locations, such as roadway or building collisions.

The estimates for scavenging loss will be factored in to the estimates for the total number of bird and bat fatalities during the study period.

Searcher Efficiency. To correct for detection bias, searcher efficiency will be estimated. Additional “test carcasses” will occasionally be placed at random locations within the search area based on bird and bat carcass availability. The test carcasses will be placed either one day before or on the day of the survey to reduce the potential for predation. The date, time, and location of test carcass placement will be documented. Someone besides the searchers will place the test carcasses and the presence of test carcasses will not be known by the searchers. The percentage of test carcasses found will be determined based on review of the data collected by the searchers.

Mortality Estimation. The mortality estimate for the Wethersfield Windpark will be calculated separately for birds and bats. Scavenging loss estimations, searcher efficiency, and the proportion of turbines searched will be used to adjust the total number of carcasses found during the searches.

To calculate the total number of fatalities for the period of time in which searches would be conducted (April to October), the estimator proposed in Erickson et al. (2003) would be used. For most of the species concerned, this time period would be an annual measurement of mortality. The rationale for this conclusion is that most species of birds and bats are not active or present during the period from November through March, so there is no risk of fatalities for those species during this time period. The point estimates for the fatality rates would be calculated for each season by the formula (or an appropriate variation of the formula):

$$m = \left(\frac{N * C}{k * t * p} \right) \left(\frac{e^{1/t} - 1 + p}{e^{1/t} - 1} \right)$$

where N is equal to the total number of turbines, C is the total number of carcasses detected for the period of study, I is the interval between searches (in days), t is the mean carcass removal time (in days), p is the detection probability, and k is the number of turbines sampled. This formula assumes correctness of the estimates for t and p (i.e., sampling error in those estimates is not considered). Fatality estimates for the entire period of study (April through October) would be calculated by summing the seasonal estimates.

Utilization – Mortality Estimation. The post-construction mortality estimation will be compared to the number of estimated collisions presented in the DEIS and to preconstruction radar study passage rates.

Task 2: Acoustical Monitoring for Bats (Summer/Fall)

Acoustical monitoring via AnaBat equipment will be conducted during the summer/fall migratory period (approximately August 1 through September 30) of the first year of the study. AnaBat monitoring equipment will be installed on a meteorological tower, wind turbine, or other structure located in the Project Area. One monitoring unit will be installed as high on the structure as possible, while the other unit will be installed midway between that unit and the ground. It is anticipated that the monitoring units will be deployed within a guy wire system and pointed in the direction of anticipated migration (facing north). Bat echolocation data will be recorded digitally and analyzed for species or species-group identification.

AnaBat detectors will be used for the duration of this study. AnaBat detectors are frequency-division detectors, dividing the frequency of ultrasonic calls made by bats so that they are audible to humans. Frequency division detectors will be used based upon their widespread use for this type of survey, their ability to be deployed for long periods of time, and their ability to detect a broad range of frequency, which allows detection of all species of bats that could occur in New York. Data from the AnaBat detectors will be logged onto compact flash media and downloaded to a computer for analysis. Detectors will be programmed to record data from 7:00 p.m. to 7:00 a.m. every night.

Call files will be extracted from data files using appropriate software, with default settings in place. Call files will be visually screened to remove files caused by wind, insect noise, and other static so that only bat calls remain. Nightly tallies of detected calls will be compiled for each detector and each night. Detection rates indicate only the number of calls detected and do not necessarily reflect the number of individual bats in an area.

Call files will be examined visually and assigned to species categories based on comparison to libraries of known bat reference calls. Categorization of calls is possible only when clear calls are recorded and only with certain species. The tree-roosting bats are typically easy to identify to species while those of the genus

Myotis are not. Call rates by species, as well as total detections and trends in species' presence in the data set, will be reported. Comparisons between call rates and species composition will also be compared between the detectors.

The results of the acoustical monitoring study will be compared to the mortality study results and weather data to identify if any temporal similarities occurred between abundance and mortality.

Task 3: Post-construction Study Report and Adaptive Management Review

A preliminary report will be prepared that will evaluate the results from the post-construction bird and bat mortality study and acoustical monitoring study based on the first year of data. Potential adaptive management measures will be identified if significant adverse impacts occur. The mortality study methodology will also be evaluated in this preliminary report. If necessary, changes will be identified for implementing the second year of the mortality study. A similar preliminary report will be prepared after the second year of the study and a final report that evaluates all of the data collected during the study will be prepared after the third year of the study.

Noble will continue to coordinate with NYSDEC regarding the adequacy of survey methodologies following review of annual reports. The need for adaptive management strategies will be assessed based on the results of the previous year's surveys.

4

References

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