

# Highlands Center Avian Survey, 2010 Season

Dennis Minsky  
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## Introduction and Methodology

As a continuation of a 2009 general avian survey at the Highlands Center in North Truro (Podolsky 2010), I surveyed birds between 11 April and 22 October, 2010. I performed a total of 67.5 hours of avian surveys at the two sites involved, 33 at the Helipad site and 34.5 at the Ballfield site (Tables 1 and 2).

Table 1: Number of dates in a given month that surveys were performed in 2010

April	4
May	8
June	6
July	2
August	6
September	7
October	8

Table 2: Number of hours surveyed in 2010, by site and date

DATE	HELIPAD	BALLFIELD
April 11		2
April 12	2	
April 25		2
April 29	2	
May 2		2
May 4		1.5
May 5		0.5
May 9	1.5	
May 10	2.5	
May 16		2
May 17	2	
May 27	1	
June 1		0.5
June 13		0.5
June 17		0.5
June 18	1	0.5
June 20	1	1
June 27	1	1
July 24		1
July 25	1	
August 2	1	1
August 4	1	1
August 5	1	1
August 17	1	1
August 20	0.5	1
August 28	1.5	1
September 4	1	1
September 5	1	1
September 14	1	1
September 15	1	1
September 18	1	1
September 21	1	1
September 22		1
October 3	1	1
October 4	1	
October 5		0.5
October 11	1.5	1
October 13	1	1
October 17		1.5
October 20	1	1
October 22	0.5	0.5
TOTAL	33	34.5

30% of the surveys were conducted in April and May, and 37% were conducted in September and October: thus, 67% of the observations took place during spring and fall migration periods. The number of observer hours invested at each site is almost identical (33 hours for the Helipad vs. 34.5 for the Ballfield). On almost half (49%) of the observation dates surveys were conducted at both sites, and therefore took place in roughly the same weather. The earliest survey was conducted after sunrise beginning at 7:47 AM and the latest ending at 6:24 PM; 60% of the surveys took place before noon and 40% took place after noon.

The general methodology of the 2010 survey is modeled after the 2009 assessment (Podolsky 2010) but differs in the following important specifics:

-Dennis Minsky was the sole observer.

-There were no nocturnal (neither post-dusk nor pre-dawn) surveys conducted. Bats were not observed.

-All surveys were conducted during daylight hours and were either “focal”, to use the terminology of the 2010 report, surveying all birds directly within the airspace represented by a circle with a radius of approximately 300 feet of the two potential turbine locations (“within the turbine bubble”), or “general”, surveying all birds beyond the approximate 600 foot diameter of the respective areas to the outward extent of visibility (“near the turbine bubble”).

I used Swift Viceroy (Model 830) 10x42 binoculars and occasionally a Swift spotting scope (zoom, 10 to 40 magnification) to make observations; I also used calls and songs to document species.

## **Results**

### **Individual and species totals:**

A total of 4,069 individual birds were counted, 2,736 at the Ballfield site (1,374 within the turbine bubble and 1,362 near the turbine bubble; Tables 3 and 4) and 1,333 at the Helipad site (655 within the turbine bubble and 678 near the turbine bubble; Tables 5 and 6). These birds represented 60 species and nine unidentified species categories (Table 7) - 45 species and 7 unidentified species categories at the Ballfield site, and 48 species and 9 unidentified species categories at the Helipad site.

### **Frequency of Observation, or Observation Rate:**

The frequency of observation, or observation rate for the Ballfield was roughly double those of the Helipad - 40 birds per hour within the turbine bubble and 39 birds per hour near the turbine bubble for the Ballfield vs. 20 birds per hour within the turbine bubble and 21 birds per hour near the turbine bubble for the Helipad site (see Tables 3 and 4).

### **Height of flight:**

For both sites, within the turbine bubbles, the vast majority of birds were seen below the one hundred foot level (90% of the Ballfield birds and 86 % of the Helipad birds), but the Helipad site yielded three

times more birds in the low level (one to ten feet) height class than the Ballfield (39% vs. 13%; Figures 1 and 2).

Species composition:

In terms of species composition, the top ten species (in terms of abundance) for both sites showed a 60% overlap (see table 8).

Raptors:

Ten species of raptors (including the Turkey Vulture) were seen in 2010 (see Table 7). In both sites, within the turbine bubbles, eight species of raptors were observed, and there was considerable overlap; no Merlins were observed at the Helipad site and no Peregrine Falcons were seen at the Ballfield site. Turkey Vultures predominated at both sites. The observation rate of raptors at each site was comparable: 1.1 per hour at the Ballfield and 0.9 per hour at the Helipad (Tables 3 and 5). Height distribution was also comparable, the majority of raptors being in the 50-100 foot height class (Figures 3 and 4).

Table 3: Bird Counts within the Turbine Bubble at the Ballfield Site, 2010 Season, by Height Class, Listed in order of Abundance (Top 10 Species Highlighted)

BIRD SPECIES	HEIGHT CLASS IN FEET							Unknown	Total
	0	1--10	10--50	50-100	100-200	200-400	400+		
<b>American Goldfinch</b>	22	1	29	117	12	0	0	1	182
<b>Chipping Sparrow</b>	6	43	41	43	0	0	0	5	138
<b>Common Grackle</b>	0	0	136	1	0	0	0	0	137
<b>Eastern Bluebird</b>	0	9	41	69	0	0	0	0	119
<b>Blue Jay</b>	0	0	61	29	0	0	0	4	94
<b>Tree Swallow</b>	0	0	18	59	16	0	0	0	93
<b>Rock Dove</b>	0	0	0	54	13	0	0	0	67
<b>American Robin</b>	1	3	20	40	0	0	0	2	66
<b>Black-capped Chickadee</b>	0	37	23	0	0	0	0	2	62
<b>Unidentified Passerine</b>	1	8	15	25	2	0	0	1	52
House Finch	0	9	3	30	0	0	0	3	45
American Crow	0	2	2	34	0	0	0	0	38
European Starling	0	0	2	33	0	0	0	0	35
Brown-headed Cowbird	3	4	9	18	0	0	0	0	34
Eastern Towhee	0	30	3	0	0	0	0	0	33
Mourning Dove	0	2	5	19	0	0	0	1	27
Red-breasted Nuthatch	0	14	1	0	0	0	0	0	15
<b>Turkey Vulture</b>	0	0	0	8	6	0	0	0	14
Northern Flicker	0	0	10	1	0	0	0	2	13

<b>BIRD SPECIES</b>	<b>0</b>	<b>1--10</b>	<b>10--50</b>	<b>50-100</b>	<b>100-200</b>	<b>200-400</b>	<b>400+</b>	<b>Unknown</b>	<b>Total</b>
American Kestrel	0	0	1	11	0	0	0	0	12
Unidentified Swallow	0	0	1	0	10	0	0	0	11
Herring Gull	0	0	0	9	0	0	0	0	9
Great Black-backed Gull	0	0	0	8	0	0	0	0	8
Baltimore Oriole	0	0	0	3	0	0	0	4	7
Yellow-rumped Warbler	0	5	1	0	0	0	0	0	6
Tufted Titmouse	0	3	3	0	0	0	0	0	6
Great Crested Flycatcher	0	0	1	0	0	0	0	5	6
Northern Cardinal	0	0	0	0	0	0	0	5	5
Gray Catbird	0	5	0	0	0	0	0	0	5
Song Sparrow	0	4	0	0	0	0	0	0	4
Sharp Shinned Hawk	0	0	3	1	0	0	0	0	4
Unidentified Warbler	0	0	1	0	0	0	0	2	3
Red Tailed Hawk	0	0	1	2	0	0	0	0	3
Pine Warbler	0	0	1	2	0	0	0	0	3
Northern Mockingbird	0	0	1	2	0	0	0	0	3
Red-winged Blackbird	0	0	0	2	0	0	0	0	2
Eastern Kingbird	0	1	1	0	0	0	0	0	2
Coopers Hawk	0	0	0	1	1	0	0	0	2
White-breasted Nuthatch	0	1	0	0	0	0	0	0	1
Unidentified Woodpecker	0	0	0	1	0	0	0	0	1
Unidentified Sparrow	0	1	0	0	0	0	0	0	1
Unidentified Gull	0	0	0	0	0	1	0	0	1
Savannah Sparrow	0	1	0	0	0	0	0	0	1
Osprey	0	0	0	0	1	0	0	0	1
Northern Harrier	0	0	0	1	0	0	0	0	1
Merlin	0	0	0	1	0	0	0	0	1
Carolina Wren	0	0	0	0	0	0	0	1	1
<b>TOTAL</b>	<b>33</b>	<b>183</b>	<b>434</b>	<b>624</b>	<b>61</b>	<b>1</b>	<b>0</b>	<b>38</b>	<b>1374</b>
PERCENT	2%	13%	32%	45%	4%	0%	0%	3%	
								Total hours	34.5
								Birds/hr.	40
<b>RAPTOR TOTAL</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>25</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>38</b>
raptor percent	0%	0%	13%	66%	21%	0%	0%	0%	100%
								Raptors/hr.	1.1

Table 4: Bird Counts Near the Turbine Bubble at the Ballfield Site, 2010 Season, by Height Class, Listed in order of Abundance (Top 10 Species Highlighted)

BIRD SPECIES	HEIGHT CLASS IN FEET							Unknow	Total
	0	1--10	10--50	50-100	100-200	200-400	400+		
Rock Dove	0	0	0	428	15	0	0	0	443
Tree Swallow	0	0	0	5	203	0	0	0	208
European Starling	0	0	1	123	0	0	0	0	124
American Crow	0	0	7	59	21	0	0	24	111
Unidentified Passerine	0	0	10	71	11	0	0	0	92
Unidentified Swallow	0	0	0	14	74	0	0	0	88
Unidentified Gull	0	0	0	9	49	18	0	0	76
Blue Jay	0	0	4	9	0	0	0	26	39
Turkey Vulture	0	0	0	10	7	3	1	0	21
American Goldfinch	0	0	0	18	3	0	0	0	21
Chipping Sparrow	0	8	2	7	0	0	0	2	19
Great Black-backed Gull	0	0	0	1	16	0	0	0	17
Red Tailed Hawk	0	0	1	6	5	0	0	0	12
Eastern Bluebird	0	0	0	12	0	0	0	0	12
Northern Flicker	0	0	1	0	0	0	0	10	11
Herring Gull	0	0	0	0	8	0	0	0	8
Mourning Dove	0	0	0	7	0	0	0	0	7
Northern Mockingbird	0	0	0	5	1	0	0	0	6
Eastern Towhee	0	1	0	0	0	0	0	5	6
Double-crested Cormorant	0	0	0	0	6	0	0	0	6
American Robin	0	0	0	3	0	0	0	3	6
American Kestrel	0	0	0	6	0	0	0	0	6
House Finch	0	0	0	4	0	0	0	1	5
Coopers Hawk	0	0	0	0	3	0	0	0	3
Bald Eagle	0	0	0	0	0	2	1	0	3
Unidentified Accipiter	0	0	0	0	2	0	0	0	2
Merlin	0	0	0	2	0	0	0	0	2
Song Sparrow	0	0	0	1	0	0	0	0	1
Sharp Shinned Hawk	0	0	0	1	0	0	0	0	1
Osprey	0	0	0	0	1	0	0	0	1
Northern Cardinal	0	0	0	0	0	0	0	1	1
Great Blue Heron	0	0	0	1	0	0	0	0	1
Eastern Phoebe	0	0	0	1	0	0	0	0	1
Brown-headed Cowbird	0	0	0	1	0	0	0	0	1
Black-capped Chickadee	0	1	0	0	0	0	0	0	1
<b>TOTAL</b>	<b>0</b>	<b>10</b>	<b>26</b>	<b>804</b>	<b>425</b>	<b>23</b>	<b>2</b>	<b>72</b>	<b>1362</b>
PERCENT	0%	1%	2%	59%	31%	2%	0%	5%	
								Total Hr.	34.5
								Bird/Hr.	39
<b>RAPTOR TOTAL</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>29</b>	<b>30</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>67</b>
RAPTOR PERCENT	0%	1%	1%	43%	45%	4%	1%	3%	
								Raptors/Hr.	1.9

Table 5: Bird Counts within the Turbine Bubble at the Helipad Site, 2010 Season, by Height Class, Listed in order of Abundance (Top 10 Species Highlighted)

BIRD SPECIES	HEIGHT CLASS IN FEET							Unknown	Total
	0	1--10	10--50	50-100	100-200	200-400	400+		
<b>Black-capped Chickadee</b>	0	86	1	0	0	0	0	1	88
<b>Blue Jay</b>	0	21	46	9	0	0	0	12	88
<b>Eastern Towhee</b>	0	49	1	0	0	0	0	1	51
<b>American Goldfinch</b>	0	1	1	44	1	0	0	1	48
<b>Unidentified Passerine</b>	0	13	17	9	3	0	0	0	42
<b>American Crow</b>	0	3	9	24	5	0	0	0	41
<b>Great Black-backed Gull</b>	0	0	0	12	21	0	0	0	33
<b>Herring Gull</b>	0	0	0	21	7	0	0	0	28
<b>Tree Swallow</b>	0	0	1	26	1	0	0	0	28
<b>Chipping Sparrow</b>	3	11	5	0	0	0	0	1	20
Pine Warbler	0	10	10	0	0	0	0	0	20
Tufted Titmouse	0	14	1	0	0	0	0	1	16
Unidentified Gull	0	0	0	1	14	0	0	0	15
Gray Catbird	0	9	2	0	0	0	0	1	12
<b>Turkey Vulture</b>	0	0	0	9	0	0	0	0	9
Mourning Dove	0	0	2	6	0	0	0	0	8
Northern Cardinal	0	5	1	0	0	0	0	2	8
American Robin	0	1	4	2	0	0	0	0	7
<b>Coopers Hawk</b>	0	0	1	4	2	0	0	0	7
Greater Yellowlegs	0	0	0	0	7	0	0	0	7
Northern Flicker	0	1	0	0	0	0	0	5	6
Red-breasted Nuthatch	0	3	3	0	0	0	0	0	6
Rock Dove	0	0	0	5	1	0	0	0	6
Brown Thrasher	1	4	0	0	0	0	0	0	5
Downy Woodpecker	0	1	4	0	0	0	0	0	5
Eastern Bluebird	0	0	0	5	0	0	0	0	5
Blue-headed Vireo	0	3	1	0	0	0	0	0	4
Field Sparrow	0	4	0	0	0	0	0	0	4
<b>Northern Harrier</b>	0	0	3	0	1	0	0	0	4
<b>Red Tailed Hawk</b>	0	0	0	2	2	0	0	0	4
Black-and-White Warbler	0	2	1	0	0	0	0	0	3
Common Yellowthroat	0	2	0	0	0	0	0	1	3
<b>American Kestrel</b>	0	0	1	1	0	0	0	0	2
Barn Swallow	0	0	0	2	0	0	0	0	2
Great Crested Flycatcher	0	0	0	0	0	0	0	2	2
<b>Northern Parula</b>	0	2	0	0	0	0	0	0	2
<b>Sharp Shinned Hawk</b>	0	1	0	1	0	0	0	0	2
Unidentified Warbler	0	1	0	0	0	0	0	1	2

<b>BIRD SPECIES</b>	<b>0</b>	<b>1--10</b>	<b>10--50</b>	<b>50-100</b>	<b>100-200</b>	<b>200-400</b>	<b>400+</b>	<b>Unknown</b>	<b>Total</b>
Magnolia Warbler	0	1	0	0	0	0	0	0	1
Northern Mockingbird	0	0	0	0	0	0	0	1	1
Osprey	0	0	0	1	0	0	0	0	1
Peregrine Falcon	0	0	0	1	0	0	0	0	1
Prairie Warbler	0	1	0	0	0	0	0	0	1
Red-eyed Vireo	0	1	0	0	0	0	0	0	1
Wild Turkey	0	1	0	0	0	0	0	0	1
White-breasted Nuthatch	0	0	1	0	0	0	0	0	1
Yellow-rumped Warbler	0	1	0	0	0	0	0	0	1
Unidentified Accipiter	0	0	0	1	0	0	0	0	1
Unidentified Wren	0	1	0	0	0	0	0	0	1
Unidentified Woodpecker	0	0	0	1	0	0	0	0	1
<b>TOTAL</b>	<b>4</b>	<b>253</b>	<b>116</b>	<b>187</b>	<b>65</b>	<b>0</b>	<b>0</b>	<b>30</b>	<b>655</b>
PERCENT	1%	39%	18%	29%	10%	0%	0%	5%	
								Total Hr.	33
								Bird/Hr.	20
<b>RAPTOR TOTAL</b>	<b>0</b>	<b>1</b>	<b>5</b>	<b>20</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>31</b>
RAPTOR PERCENT	0%	3%	16%	65%	16%	0%	0%	0%	
								Raptors/Hr.	0.9

Table 6: Bird Counts near the Turbine Bubble at the Helipad Site, 2010 Season, Height Class, Listed in order of Abundance (Top 10 Species Highlighted)

BIRD SPECIES	HEIGHT CLASS IN FEET							Unknown	Total
	0	1--10	10--50	50-100	100-200	200-400	400+		
<b>Unidentified Gull</b>	0	0	0	11	208	160	0	0	379
<b>American Crow</b>	0	0	8	23	1	0	0	55	87
<b>Blue Jay</b>	0	0	1	18	0	0	0	16	35
<b>Great Black-backed Gull</b>	0	0	0	14	13	5	0	0	32
<b>Unidentified Swallow</b>	0	0	1	3	16	0	0	0	20
<b>Northern Flicker</b>	0	0	1	1	0	0	0	14	16
<b>Unidentified Passerine</b>	0	0	1	11	8	0	0	0	15
<b>Red Tailed Hawk</b>	0	0	0	1	7	4	0	1	13
<b>Tree Swallow</b>	0	0	0	0	12	0	0	0	12
<b>Herring Gull</b>	0	0	0	2	9	0	0	0	11
American Goldfinch	0	0	0	9	1	0	0	0	10
<b>Turkey Vulture</b>	0	0	0	0	6	2	0	0	8
<b>Unidentified Raptor</b>	0	0	0	0	1	0	0	0	6
American Robin	0	0	4	0	0	0	0	1	5
<b>American Kestrel</b>	0	0	1	3	0	0	0	0	4
Double-crested Cormorant	0	0	0	1	2	0	0	0	3
Black-capped Chickadee	0	2	0	0	0	0	0	0	2
Mourning Dove	0	0	1	1	0	0	0	0	2
Northern Cardinal	0	0	0	0	0	0	0	2	2
<b>Coopers Hawk</b>	0	0	0	0	2	0	0	0	2
Northern Mockingbird	0	0	2	0	0	0	0	0	2
<b>Unidentified Accipiter</b>	0	0	0	0	2	0	0	0	2
Eastern Towhee	0	1	0	0	0	0	0	0	1
Gray Catbird	0	1	0	0	0	0	0	0	1
Great Crested Flycatcher	0	0	0	0	0	0	0	1	1
<b>Sharp Shinned Hawk</b>	0	0	0	0	1	0	0	0	1
Unidentified Warbler	0	0	0	0	0	0	0	1	1
<b>Osprey</b>	0	0	0	0	1	0	0	0	1
White-breasted Nuthatch	0	0	1	0	0	0	0	0	1
<b>Bald Eagle</b>	0	0	0	0	1	0	0	0	1
Ovenbird	0	1	0	0	0	0	0	0	1
Unidentified Sparrow	1	0	0	0	0	0	0	0	1
<b>TOTAL</b>	1	5	21	98	291	171	0	91	678
<b>PERCENT</b>	0%	1%	3%	14%	43%	25%	0%	13%	
								Total hours	33
								Birds/hr.	21
<b>RAPTOR TOTAL</b>	0	0	1	4	21	6	0	1	33
<b>RAPTOR PERCENT</b>	0%	0%	3%	12%	64%	18%	0%	3%	
								Raptors/hr.	1.0

Figure 1: Number of Birds by Height Class within the Turbine Bubble at the Ballfield Site

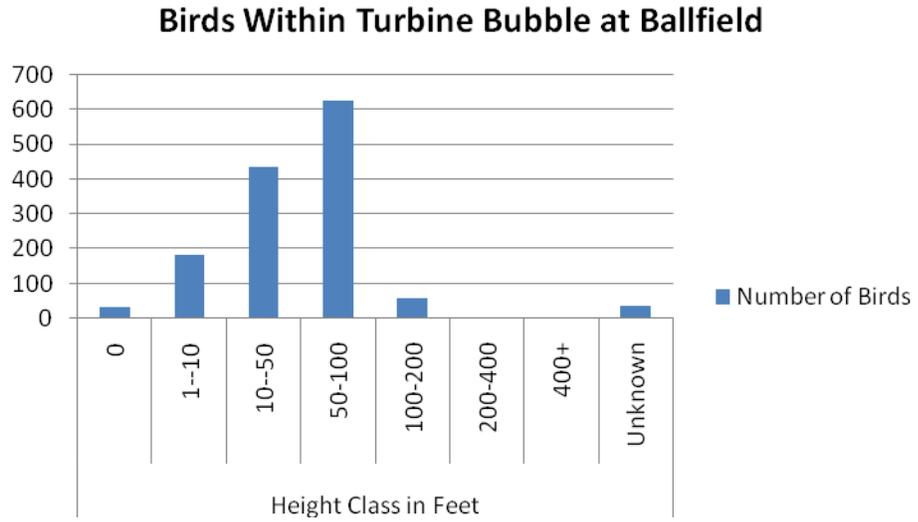


Figure 2: Number of Birds by Height Class within the Turbine Bubble at the Helipad Site

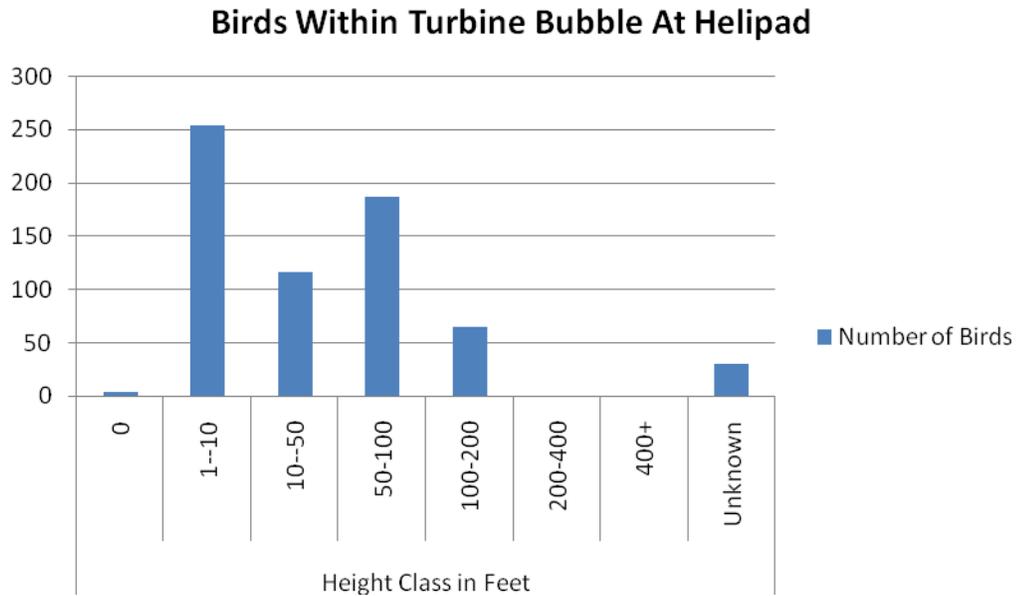


Figure 3: Number of Raptors by Height Class Within the Turbine Bubble at the Ballfield Site

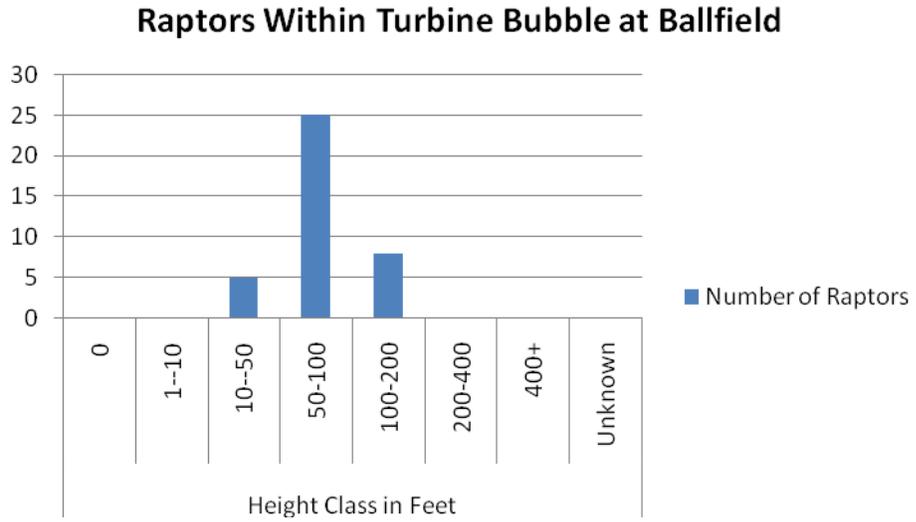


Figure 4: Number of Raptors by Height Class within the Turbine Bubble at the Helipad Site

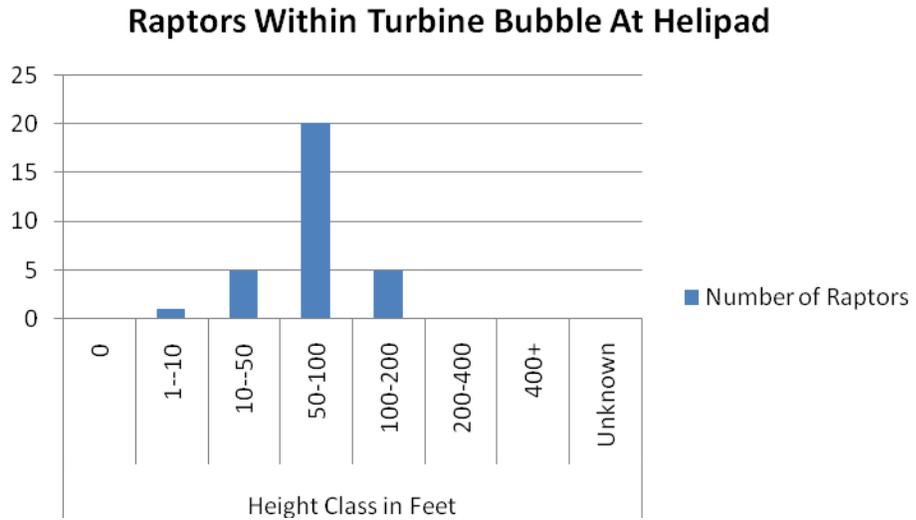


Table 7: Avian Species at Ballfield and Helipad Sites, Season of 2010 (Raptors [including Turkey Vulture] highlighted; state listed species' status noted)

BIRD SPECIES	BALLFIELD			HELIPAD		
	IN	NEAR	TOTAL	IN	NEAR	TOTAL
American Crow	38	111	149	41	87	128
American Goldfinch	182	21	203	48	10	58
American Kestrel	12	6	18	2	4	6
American Robin	66	6	72	7	5	12
Bald Eagle <b>Endangered</b>	0	3	3	0	1	1
Barn Swallow	0	0	0	2	0	2
Baltimore Oriole	7	0	7	0	0	0
Black-capped Chickadee	62	1	63	88	2	90
Black-and-White Warbler	0	0	0	3	0	3
Blue-headed Vireo	0	0	0	4	0	4
Blue Jay	94	39	133	88	35	123
Brown-headed Cowbird	34	1	35	0	0	0
Brown Thrasher	0	0	0	5	0	5
Carolina Wren	1	0	1	0	0	0
Chipping Sparrow	138	19	157	20	0	20
Common Grackle	137	0	137	0	0	0
Common Yellowthroat	0	0	0	3	0	3
Cooper's Hawk	2	3	5	7	2	9
Double-crested Cormorant	0	6	6	0	3	3
Downy Woodpecker	0	0	0	5	0	5
Eastern Bluebird	119	12	131	5	0	5
Eastern Kingbird	2	0	2	0	0	0
Eastern Phoebe	0	1	1	0	0	0
Eastern Towhee	33	6	39	51	1	52
European Starling	35	124	159	0	0	0
Field Sparrow	0	0	0	4	0	4
Great Black-backed Gull	8	17	25	33	32	65
Great Blue Heron	0	1	1	0	0	0
Great Crested Flycatcher	6	0	6	2	1	3
Gray Catbird	5	0	5	12	1	13
Greater Yellowlegs	0	0	0	7	0	7
Herring Gull	9	8	17	28	11	39
House Finch	45	5	50	0	0	0
Magnolia Warbler	0	0	0	1	0	1
Merlin	1	2	3	0	0	0
Mourning Dove	27	7	34	8	2	10
Northern Cardinal	5	1	6	8	2	10

BIRD SPECIES	BALLFIELD			HELIPAD		
	IN	NEAR	TOTAL	IN	NEAR	TOTAL
Northern Flicker	13	11	24	6	16	22
Northern Harrier <b>Threatened</b>	1	0	1	4	0	4
Northern Mockingbird	3	6	9	1	2	3
Northern Parula <b>Threatened</b>	0	0	0	2	0	2
Osprey	1	1	2	1	1	2
Ovenbird	0	0	0	0	1	1
Peregrine Falcon <b>Endangered</b>	0	0	0	1	0	1
Pine Warbler	3	0	3	20	0	20
Prairie Warbler	0	0	0	1	0	1
Red-breasted Nuthatch	15	0	15	6	0	6
Red-eyed Vireo	0	0	0	1	0	1
Rock Dove	67	443	510	6	0	6
Red Tailed Hawk	3	12	15	4	13	17
Red-winged Blackbird	2	0	2	0	0	0
Savannah Sparrow	1	0	1	0	0	0
Sharp Shinned Hawk <b>Special Concern</b>	4	1	5	2	1	3
Song Sparrow	4	1	5	0	0	0
Tufted Titmouse	6	0	6	16	0	16
Tree Swallow	93	208	301	28	12	40
Turkey Vulture	14	21	35	9	8	17
Wild Turkey	0	0	0	1	0	1
White-breasted Nuthatch	1	0	1	1	1	2
Yellow-rumped Warbler	6	0	6	1	0	1
Unidentified Accipiter	0	2	2	1	2	3
Unidentified Gull	1	76	77	15	379	394
Unidentified Passerine	52	92	144	42	15	57
Unidentified Raptor	0	0	0	0	6	6
Unidentified Sparrow	1	0	1	0	1	1
Unidentified Swallow	11	88	99	0	20	20
Unidentified Warbler	3	0	3	2	1	3
Unidentified Wren	0	0	0	1	0	1
Unidentified Woodpecker	1	0	1	1	0	1

Total: 60 species, including 10 raptors, plus 9 unidentified species categories:

Table 8: Comparison of Ten Most Abundant Avian Species, in Order of Abundance, within Turbine Bubble at the Ballfield and Helipad Sites in 2010

Note: Numbers in parentheses are the total numbers recorded for each species

Helipad Site	Ballfield Site
Black-capped Chickadee (88)	American Goldfinch (182)
Blue Jay (88)	Chipping Sparrow (138)
Eastern Towhee (51)	Common Grackle (137)
American Goldfinch (48)	Eastern Bluebird (119)
Unidentified Passerine (42)	Blue Jay (94)
American Crow (41)	Tree Swallow (93)
Great Black-backed Gull (33)	Rock Dove (67)
Herring Gull (28)	American Robin (66)
Tree Swallow (28)	Black-capped Chickadee (62)
Chipping Sparrow (20)	Unidentified Passerine (52)

Table 9: Avian Species Observed in 2009 Surveys That Were Not in 2010 Surveys

SPECIES	SITE
Belted Kingfisher	Ballfield
Black -Throated Green Warbler	Helipad
Blue-Gray Gnatcatcher	Helipad
Cedar Waxwing	Ballfield and Helipad
Chimney Swift	Helipad
Common Tern	Helipad
Dark-Eyed Junco	Ballfield
Eastern Wood-Pewee	Ballfield and Helipad
Grasshopper Sparrow	Ballfield
Great Egret	Helipad
Great Horned Owl*	Ballfield and Helipad
Hairy Woodpecker	Ballfield
House Sparrow	Ballfield
House Wren	Helipad
Least Tern	Helipad
Northern Bobwhite Quail	Ballfield and Helipad
Palm Warbler	Helipad
Red-Bellied Woodpecker	Ballfield
Ruby-Crowned Kinglet	Helipad
Ruby-Throated Hummingbird	Ballfield
Vesper Sparrow	Ballfield
White-Throated Sparrow	Ballfield
TOTAL: 22 plus:	
Unidentified Blackbird	Helipad
Unidentified Crow	Helipad
Unidentified Duck	Ballfield
Unidentified Falcon	Ballfield and Helipad
Unidentified Icterid	Ballfield
Unidentified Loon	Helipad
Unidentified Tern	Helipad
Unknown species	Ballfield and Helipad

\* seen or heard during nocturnal (pre-dawn or post-dusk surveys, performed in 2009, but not in 2010.

Table 10: Avian Species Observed in 2010 Surveys That Were Not in 2009 Surveys

SPECIES	SITE
American Kestrel	Ballfield
Bald Eagle	Ballfield and Helipad
Blue-Headed Vireo	Helipad
Brown Thrasher	Helipad
Carolina Wren	Ballfield
Field Sparrow	Helipad
Great Blue Heron*	Ballfield
Magnolia Warbler	Helipad
Northern Mockingbird	Ballfield and Helipad
Northern Parula Warbler	Helipad
TOTAL: <b>10</b> plus	
Unidentified Accipiter	Ballfield and Helipad
Unidentified Gull	Ballfield and Helipad
Unidentified Passerine	Ballfield and Helipad
Unidentified Raptor	Helipad
Unidentified Sparrow	Ballfield and Helipad
Unidentified Swallow	Ballfield and Helipad
Unidentified Warbler	Ballfield and Helipad
Unidentified Woodpecker	Ballfield and Helipad
Unidentified Wren	Helipad

\* seen in 2009 only in Podolsky’s “general” surveys of the Highlands Center, not at either Ballfield or Helipad site

Table 11: “Listed” Species Observed during Highlands Center Survey in 2010;  
(species in alphabetical order) E= endangered, T= threatened, SC= special concern (all state listed; no federally listed species observed)  
(within= within turbine bubble; near= near turbine bubble)

	<b>Ballfield</b>			<b>Helipad</b>		
	Within	Near	Total	Within	Near	Total
American Kestrel	12	6	18	2	4	6
Bald Eagle <b>E</b>	0	3	3	0	1	1
Cooper’s Hawk	2	3	5	7	2	9
Merlin	1	2	3	0	0	0
Northern Harrier <b>T</b>	1	0	1	4	0	4
Northern Parula <b>T</b>	0	0	0	2	0	2
Osprey	1	1	2	1	1	2
Peregrine Falcon <b>E</b>	0	0	0	1	0	1
Red-Tailed Hawk	3	12	15	4	13	17
Sharp-Shinned Hawk <b>SC</b>	4	1	5	2	1	3
Turkey Vulture	14	21	35	9	8	17
Unidentified accipiter	0	2	2	1	2	3
Unidentified raptor	0	0	0	0	6	6
<b>TOTAL</b>	<b>38</b>	<b>51</b>	<b>89</b>	<b>33</b>	<b>38</b>	<b>71</b>

## **Discussion**

While the number of species seen at the two potential wind turbines sites in the 2010 season was comparable (45 at the Ballfield and 48 at the Helipad), the number of individuals was not (2,736 at the Ballfield and 1,333 at the Helipad). The difference in site characteristics explains the fact that the Ballfield hosted twice as many individual birds. There is a greater heterogeneity of habitat types in the vicinity of the Ballfield- the open field (mixed native and invasive grasses and weeds) itself, the fence that encloses it, power lines and telephone poles, buildings, and surrounding mixed shrub and woodlands. Indeed, the anthropogenic influences alone- the power lines and nearby buildings- attracted at least three of the top ten species (Eastern Bluebird, Rock Dove, and American Robin) at the Ballfield, and the fence was also often used by other species (Chipping Sparrow, for instance). The Helipad site is surrounded by a more homogenous array of scrub pine and oak woodlands, and some open native grassland and open sandy heath within 600 feet to the east.

Differences in species composition can be attributed to the above referenced site characteristics. Four of the top ten species (in terms of abundance) at the Helipad site were woodland species (Black-capped Chickadee, Blue Jay, Eastern Towhee, and Chipping Sparrow), and were almost always seen in shrubs or low trees; this contributes to the greater activity (39% of observations) at the 1-10 foot level, (compared to just 13% at the Ballfield). The other six Helipad species (American Goldfinch, Unidentified Passerine, American Crow, Great Black-backed Gull, Herring Gull, and Tree Swallow) at that site were for the most part “fly-overs”. There were many such “fly-overs” at the Ballfield site as well, but the already explained site characteristics contributed to a somewhat different array of species. Still, the 60% overlap should not be surprising, given the proximity of these two sites.

Raptor abundance and volume and species composition were relatively similar at the two sites (Table 11). Turkey Vultures predominated at both. The second-most numerous raptor at the Ballfield site, the American Kestrel, is entirely attributable to the presence of power lines used as perches by that species. Merlins were also observed perching at this site and were not observed at all at the Helipad site. The Cooper's Hawks and Sharp-shinned Hawks at the Helipad site were more often seen in pursuit of prey than those same accipiters observed at the Ballfield site. Northern Harriers were more prevalent at the Helipad site presumably because they preferred the low brushy habitat there.

Height distribution of all species of birds, including raptors, at the two sites was roughly comparable, although, as mentioned above, the Helipad had more activity at the 1-10 foot level, and therefore a lower percentage of activity at the 50-100 foot level (29%) than the Ballfield (45%).

#### Comparison of "within turbine bubble" with "near turbine bubble" counts

The preceding discussion applies to the counts of birds within the turbine bubbles at the two sites. Counts were also taken of all birds seen "near" the turbine bubbles, that is, any birds observed beyond the approximate 600 foot diameter of the sites, to the outward extent of visibility. These counts correspond very closely to their respective counts within the bubbles and generally reflect the same influences described above. The species composition, however, differs considerably between "within bubble" and "near bubble" for each site. These differences are heavily influenced by the greater visibility of larger species at these greater distances (or an easily recognized flight pattern or body silhouette of a smaller species). Hence, gulls, crows, Tree Swallows, European Starlings, Blue Jays, and larger raptors are more heavily represented in these counts. Another influence is the presence of the flat-roofed buildings in the vicinity of the Ballfield that accounted for the 443 Rock Doves, the most abundant "near bubble" species at that site. Of course smaller species are underrepresented in these counts, as is activity below the 50-foot level.

#### Comparison of 2010 with 2009

This survey was modeled after the 2009 survey directed by Dr. Richard Podolsky (Podolsky 2010). It is therefore appropriate to compare results. I restrict my comparisons, however, to Podolsky's "focal" (i.e. "within turbine bubble") counts, because his "general" counts included Highlands Center "campus"-wide counts in with the "near turbine bubble" counts, making the data not directly comparable.

Podolsky (2010) reported a higher total of birds seen, (8,168 vs. 4,069 this season), which is not surprising, given the higher number of focal survey hours (128 vs. 67.5 this season). However, his report of birds per hour is also much higher than the 2010 survey results (74 birds per hour for the Ballfield, vs. 40 birds/hour this season, and 56 birds per hour for the Helipad, vs. 20 birds per hour this season). There were 22 species seen in 2009 that were not seen in 2010 (but 10 species seen in 2010 that were not seen in 2009) (see tables 9 and 10).

Podolsky (2010) reported that 63 % of Ballfield flight activity was at the 50-100 foot level (vs. 45% this season) and 51 % of Helipad flight activity at the same level (vs. 29% this season). His top ten (most abundant) species at the Ballfield included eight of this season's top 10? (it included European Starling and House Finch, and did not include Common Grackle and Black-capped Chickadee). His top ten (most abundant) species at the Helipad included seven of this season's top 10? (it included American

Robin, Unidentified Gull, and Cedar Waxwing, and did not include Eastern Towhee, Great Black-backed Gull, and Chipping Sparrow).

I have no ready explanation for the differences between 2009 and 2010. Because I was the principal observer in both seasons, the methodology was consistent. There were more 2009 counts in early morning and early evening hours in comparison to 2010, which tended to be later morning and mid-to-late afternoon hours. The earliest start time of a 2009 count was 6 AM and latest ending time was at 7:40 PM. In contrast, in 2010, the earliest start time of a survey was at 7:47 AM and the latest ending time was at 6:24 PM. But differences between two years are to be expected and can be affected by such episodic species as Cedar Waxwings, European Starlings, and Common Grackles.

### Listed species

No federally listed species were observed during this survey. Of the five state listed species seen in 2010, four were raptors (see Table 11). There was a single observation of two Northern Parula Warblers (state threatened) within the turbine bubble at the Helipad site. Bald Eagles and Peregrine Falcons (state endangered) were rarely seen; a single Peregrine Falcon was observed within the turbine bubble at the Helipad site but not at the Ballfield site; eagles were not seen within the turbine bubbles of either site. As mentioned above, Northern Harriers (state threatened) primarily occurred in the low brushy habitat of the Helipad site. Sharp-Shinned Hawks (state special concern) were slightly more common at the Ballfield site, especially within the turbine bubble.

### Conclusion

Although this survey of 2010 differs in some significant details from the one in 2009, it does support Podolsky's major conclusion: the Ballfield site hosts many more birds and greater bird activity than the Helipad site. Future plans for redevelopment uses and activities at the Highlands Center should take this difference into account.

A comparison of two seasons is just that. The variability of the natural world requires long-term attention to properly ascertain the status quo or possible trends. To that end, I would recommend that the avian surveys at the Highlands Center be continued.

### Acknowledgements

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### Literature Cited

Podolsky, R. 2010. 2009 Bird and Bat Assessment, Highlands Center Proposed Wind Turbine Project Site Cape Cod National Seashore. Unpublished report prepared for: Boreal Renewable Energy Development under contract with the National Park Service