

# Small and Large Bird Surveys: Adam's Point Proposed Wind Energy Site 2013-2014 - Final Report



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<b>Table of Contents</b>	<b>Page</b>
Executive Summary.....	1
Introduction.....	2
Study Site and Methods.....	2
Study Site Description.....	2
Large Bird Surveys.....	3
Incidental Observations.....	6
Bald Eagle Flight Path Analysis.....	6
Songbird Surveys.....	6
Winter Surveys .....	7
Results and Discussion.....	8
Large Bird Surveys .....	9
Large Bird Flight Behavior.....	10
Bald Eagle Flight Path Analysis.....	11
Small Bird Surveys.....	12
Winter Surveys.....	15
Literature Cited.....	15

## Executive Summary

In order to provide data supportive to the environmentally-sensitive siting of wind turbines MNFI was contracted by Metro Consulting LLC to conduct pre-construction bird surveys on behalf of Swan Bay Wind LLC's proposed Adams Point Wind Farm to better understand the density, species composition, habitat use, and flight behaviors of birds in the project area. We conducted large bird surveys, small bird surveys and winter surveys of non-breeding eagles during Fall 2013 and Winter 2014 to document migrating birds or birds using the area as a migration stopover site or winter concentration area.

We conducted 58 large bird surveys during peak fall passage of migrating raptors and recorded 1,881 large birds of 28 species. The most common groups recorded included waterfowl, waterbirds and raptors. The bald eagle was the most frequently documented raptor with a total of 189 sightings. During large bird surveys, a total of 617 "eagle minutes" were recorded. In addition, 111 "eagle minutes" were recorded during incidental observations and surveys for small birds for a total of 728 "eagle minutes". "Eagle minutes" are defined by the United States Fish and Wildlife Service (USFWS) as the number of minutes that eagles are observed flying at or below 200m during surveys. Assuming that the wind turbine rotor swept area (RSA) is  $\leq 200\text{m}$  in height, 98.7% of all observations were within the RSA. The percentage of bald eagles flying within the RSA was 98.4%. The mean altitude of all birds observed during fall migration was 54.2m.

In reviewing the Fall 2013 large bird survey data, it appears that the Adam's Point project area provides migratory stopover and foraging habitat for bald eagles in the fall. During the period that the salmon were migrating up the Swan River (Oct 1-15), large numbers of bald eagles were observed in the vicinity of the Lake Huron shoreline and the mouth of the river feeding on salmon. In addition, large flocks of migrating waterfowl were observed in mid- to late-October flying southeast along the shoreline as well as across the project area, especially in the vicinity of Swan Lake. Numerous eagles were also recorded near Swan Lake. The concentration of fish and waterfowl in October is likely responsible for the large number of eagles utilizing the area. These data suggest that the flight behavior of bald eagles as well as other large birds recorded in the project area puts them at risk of collisions with wind turbines. Adam's Point may not be an important funneling area for large groups of migrating raptors but appears to provide important foraging and stopover habitat for migrating birds, specifically bald eagles.

During point count surveys targeting small birds, a total of 771 individuals (43 bird species) were recorded during Fall 2013 with a mean number of 17.9 birds observed during each 10-minute survey. The most common groups observed were waterfowl, waterbirds, corvids (crows, ravens) and snow buntings. In addition, 28 bald eagles, three state threatened merlins and one observation of the state special concern northern harrier were recorded. Although several bald eagles were seen near the Swan River in the western portion of the project site it does not appear that this area is a critical winter concentration area for bald eagles. Because access to the entire site was limited due to deep snow and impassable roads, it is unclear whether other areas of the project site provide habitat for winter concentrations of eagles. Aerial surveys, snowmobile surveys, or other means to access the site are recommended for future winter surveys.

It is hoped that these data will help wind energy developers and resource managers make informed decisions regarding the potential impacts of this project to birds and to develop appropriate strategies to mitigate potential impacts.

## **Introduction**

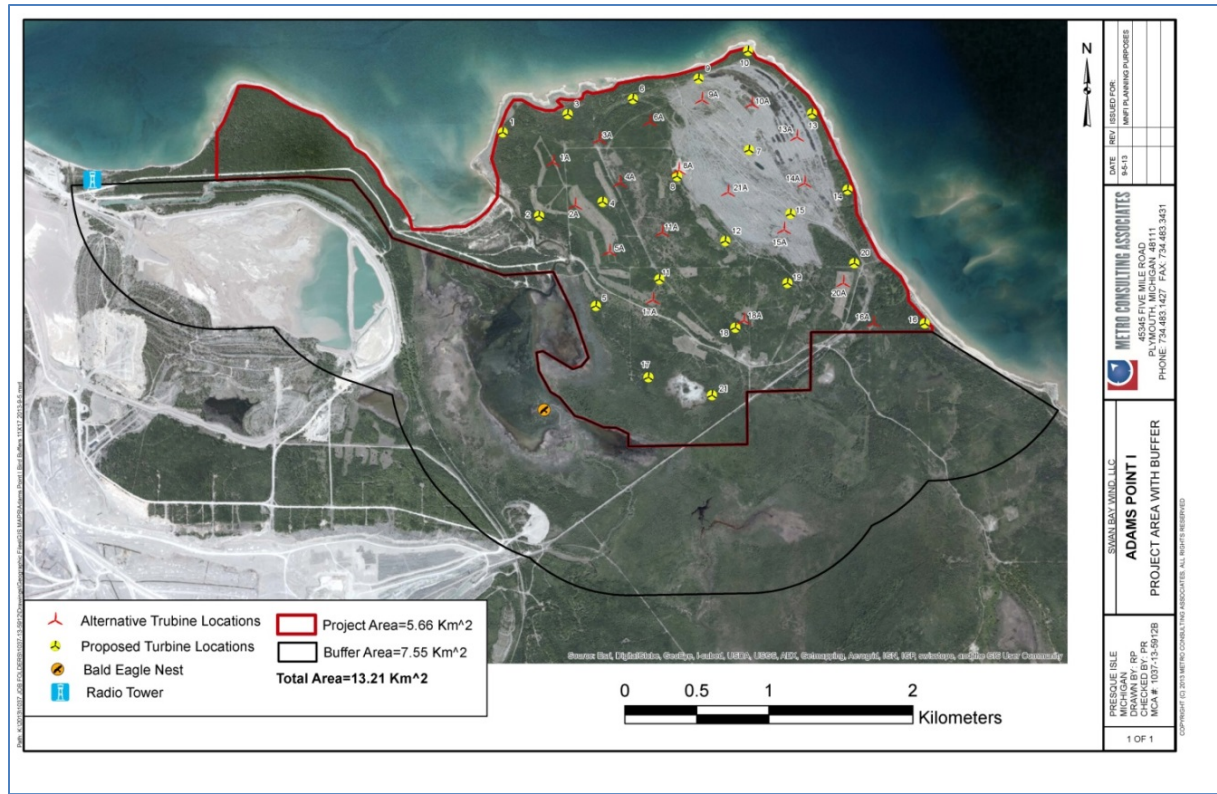
Wind energy development has the potential to provide a long-term source of renewable energy. While Great Lakes shoreline areas have high potential for wind energy generation they also provide important habitat for wildlife, especially migratory birds. Ewert et al. (2012) emphasize the importance of the Great Lakes coastal and nearshore areas as stopover sites for groups of migratory birds including waterfowl, shorebirds, raptors, songbirds and waterbirds. Recent research has documented bird mortality associated with wind energy facilities as a result of collisions, but the frequency of these events is site and situation specific. Birds that fly within the rotor swept area of a turbine are at risk of collision and therefore the frequency of avian collisions at turbine sites is likely correlated to the density of birds in the local area. Informed siting of wind turbines can mitigate the potential for bird collisions.

In order to provide data supportive to the environmentally-sensitive siting of turbines MNFI was contracted by Metro Consulting LLC to conduct pre-construction bird surveys on behalf of Swan Bay Wind LLC's proposed Adams Point Wind Farm ("Adams Point") to better understand the density, species composition, habitat use, and flight behaviors of birds in the project area. We conducted a specialized type of point count survey at two large bird viewing stations during Fall 2013 to document large birds migrating through the area or using the area as a migration stopover site. We also recorded eagle use of the area by recording eagle movements and activities on maps in the field. Finally, we conducted standard point count surveys for songbirds to better evaluate bird use of the various habitats in the project area. It is hoped that these data will help wind energy developers and resource managers make informed decisions regarding the potential impacts of this project to birds and to develop appropriate strategies to mitigate potential impacts.

## **Study Site and Methods**

### **Study Site Description**

Research was conducted at the proposed Adam's Point Wind Farm located in the vicinity of Rogers City within Presque Isle County, in northeast Michigan, USA (Fig 1.). The project area consists primarily of an inactive limestone quarry in which shrubs and young trees are beginning to establish. Wetlands including northern fen occur in the vicinity of Swan Lake and the Swan River. Forested areas are present along the Swan River and in the vicinity of the Lake Huron shoreline. The proximity of the project area to a Great Lakes shoreline suggests that this area may provide stopover habitat for migratory birds. Our study area includes the shoreline areas thereby providing a thorough survey effort.

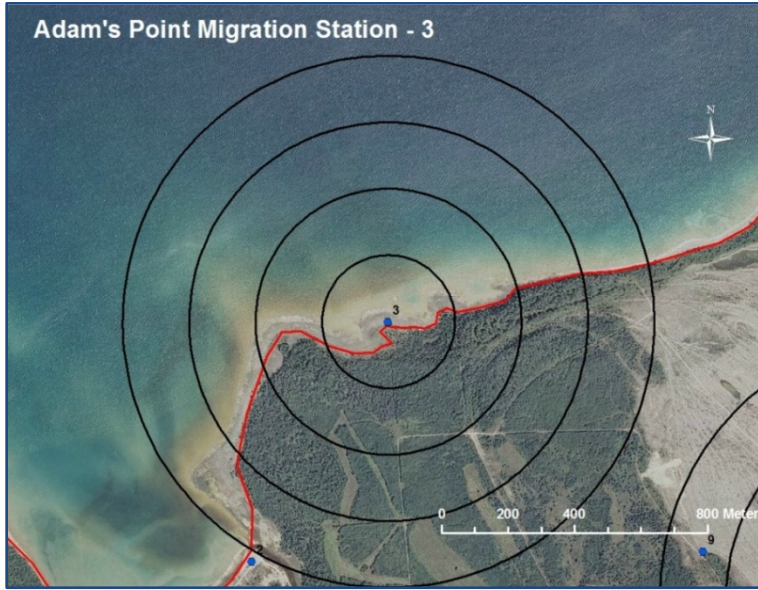


**Figure 1.** Adams Point is located within a portion of a limestone quarry (currently inactive). Proposed and alternative turbine locations are depicted with red and yellow symbols. A bald eagle nest (orange circle) is located along the edge of Swan Lake. The Swan River flows through the project site to Lake Huron.

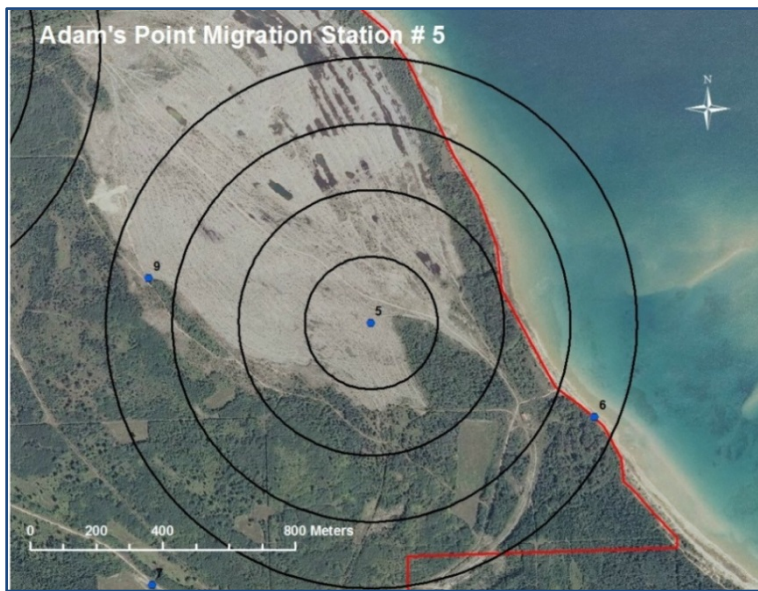
### **Large bird surveys**

We established two viewing stations for raptors and other large birds (crows and ravens, raptors, waterfowl, and waterbirds) in the project area with an alternate station designated for use during inclement weather (Fig. 2 and Fig. 3). These stations were located to provide the greatest visual coverage, focusing on topographic features likely to attract or funnel migrating raptors such as ridges and coastlines that have strong, reliable lakeshore breezes, especially helpful for soaring birds like raptors. In addition, the stations were designed to provide spatial coverage of at least 30% of the project footprint as recommended in the United States Fish and Wildlife Service (USFWS) 2013 Eagle Conservation Plan Guidance (ECPG). The size of the project area, including the recommended 1km buffer was calculated to be 13.2 km<sup>2</sup>; 30% of the project area was calculated at 3.96 km<sup>2</sup>. Two stations with a circular radius of 800 meters (2 km<sup>2</sup>) were established to provide adequate coverage of the area. Following methods similar to those used at Hawkwatch International migration sites (Hoffman and Smith 2003) and recommendations for survey design specified in the USFWS ECPG, we conducted three 2-hour surveys each day, 4 days each week from September 30 - November 15, 2013 during fall peak passage of migratory raptors. We conducted a total of fifty-eight 2-hour surveys on 22 days. Migration count data collected at the two viewing stations simultaneously

contributed point count data as recommended in the ECPG. When conducting bird surveys, flexibility in scheduling is needed to ensure that surveys are conducted under proper conditions. Some planned survey days were missed due to poor visibility resulting from inclement weather.



**Figure 2.** Large bird viewing station #3 within the Adam’s Point project area. Surveys were conducted in Fall 2013. The circular radius of the station is 800m. Additional blue dots designate small bird point count stations. Station #2 was designated as an alternate large bird viewing station in case of inclement weather. Base aerial map: National Agric. Imagery Program (NAIP) 2012.



**Figure 3.** Large bird viewing station #5 within the Adam’s Point project area. Large bird surveys were conducted at the viewing station in Fall 2013. The circular radius of the station is 800m. Additional blue dots designate small bird point count stations. Base aerial map: National Agric. Imagery Program (NAIP) 2012.

Each raptor, large bird and birds with sensitive status (i.e., species listed by the state or federal government as special concern, threatened or endangered) were recorded in addition to the bird's flight path, flight direction, approximate flight altitude (when first observed) and the estimated distance to each bird from the observer. Surveyors referenced landmarks and maps for measuring distance to birds and flight altitude and recorded the behavior and habitat use of each bird (Fig 4). Behavior categories were as follows: perched (PE), soaring (SO), flapping (FL), hunting (HU), gliding (GL), hovering (HO), auditory detection only (AUD) and other (OT, noted in comments). Additional observations were also noted. Weather data were collected each hour of large bird surveys; specifically temperature, wind speed, wind direction, humidity, precipitation and barometric pressure. The date, start and end time of the observation period, species or best possible identification, number of individuals, sex and age class (if determined), distance from plot center and height above ground activity and habitat(s) were recorded.

“Eagle minutes” are defined by the USFWS as the number of minutes (rounding up to the next highest minute) that eagles are observed flying at or below 200m during survey counts. The turbine hazardous area outlined in the USFWS ECPG is defined as the rotor swept area (RSA) around a turbine or proposed turbine from 0 to 200m (km<sup>2</sup>). “Eagle minutes” were recorded during large bird surveys as well as during point count surveys for small birds and during incidental observations. Perched birds or those flying higher than 200m were recorded separately but not included in the calculation of “eagle minutes”.



**Figure 4.** Large bird migration station #5 located in the quarried area in the southeast portion of the project area. Landmarks and maps were used as a reference for measuring distance and flight height.



### **Incidental observations**

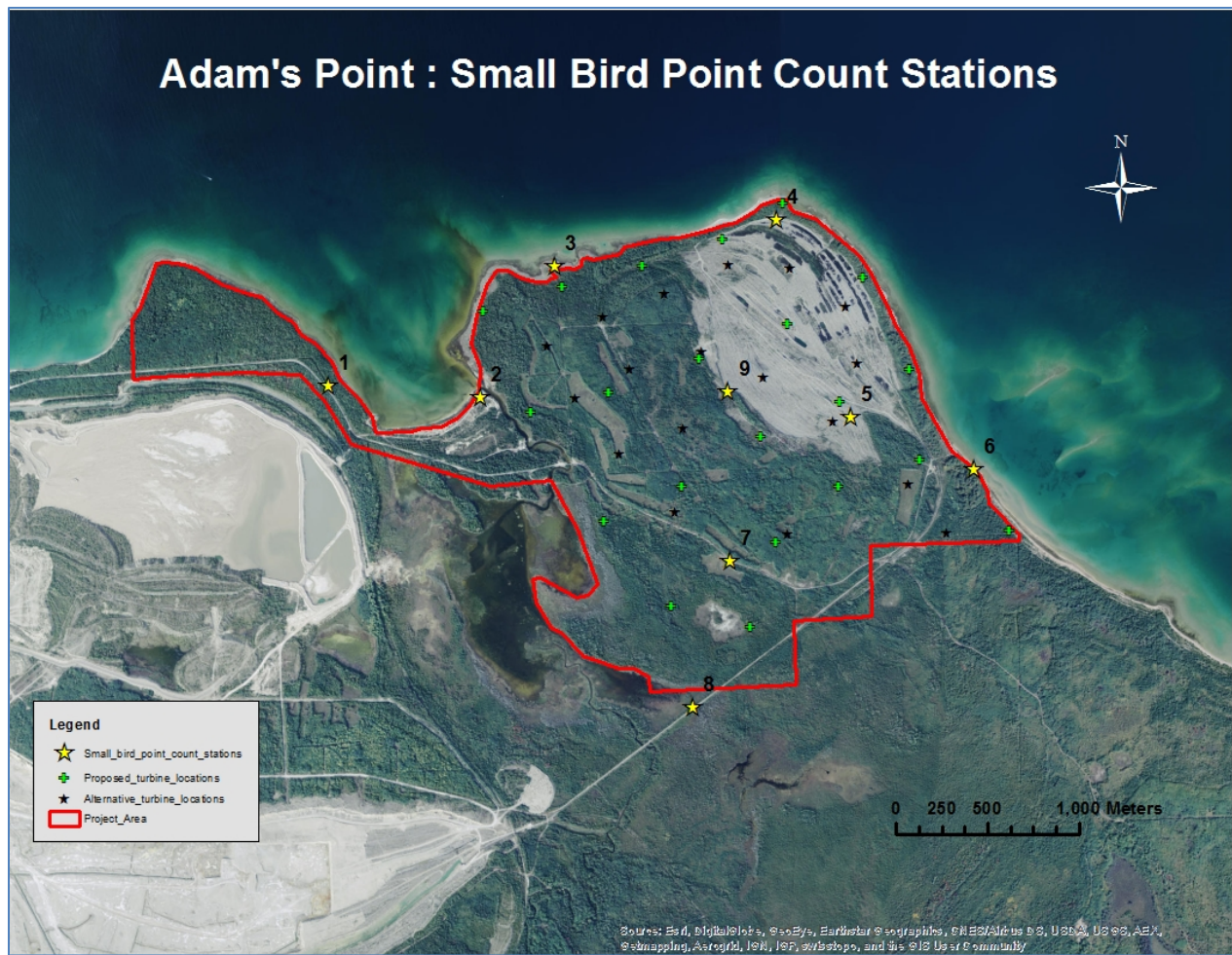
Incidental observations of eagles, other raptors and birds with sensitive status that occurred during exploration of the project site or travel between bird survey stations were also recorded including date, species, time observed, sex and age (if determined), distance from observer, flight height at first observation, behavior and activity, GPS coordinates, weather conditions and any other significant notes or comments. Any observations of eagles flying less than 200m high and within an 800m radius were recorded as “eagle minutes”.

### **Bald Eagle Flight Path Analysis**

All flight paths of eagles recorded during surveys were digitized into an ArcMap project. A polyline was created for each eagle flight path documented by reproducing the cardinal direction and length of the flight into a spatial layer. A shapefile of the polylines was created to represent all of the eagle flight paths recorded during the Fall of 2013. The number of “eagle minutes” associated with each polyline was entered into the attribute table for this layer as well as any other additional comments such as location, height at first observation or eagle behavior.

### **Songbird surveys**

In an effort to quantify songbird use of the project area during fall migration, we collected data using methods similar to those used in studies estimating breeding bird densities (Reynolds et al. 1980, Johnson et al. 2000). Nine point count stations were established within the project area and 10-minute surveys (following 2 minutes of silence) were conducted five times at each station during the Fall (2013) migration season (mid-September - October). Point count stations were established in a variety of habitats including sparsely-vegetated quarried areas, forested shorelines and riparian areas, grassy openings and wetlands associated with Swan Lake (Figure 5).



**Figure 5.** Location of 9 point count stations where surveys for small birds were conducted during the fall songbird migration season in 2013.

### **Winter Surveys of Non-Breeding Eagles**

Winter surveys of non-breeding eagles were conducted during four days in December (2013) and on one day in January (2014) to determine whether the Adam's Point project area provides roosting habitat for winter concentrations of eagles. Due to the inaccessibility of many roads in the project area during this time, most observations in December and January occurred in the western portion of the project area, especially near the Swan River fish ladder, the Swan River bridge and near the Lake Huron shoreline. We were able to survey the entire project area on December 5, 2013 before the roads became impassible.. Surveyors spent a total of 10.5 hours looking for bald eagles during these 5 visits to the area. A snowstorm in January limited the amount of time when suitable survey conditions were present.

## Results and Discussion

### Large bird surveys- Fall 2013

During the 58 large bird surveys, observers documented 1,881 birds of 28 species. There was a mean of 32.4 birds detected per 2-hour survey (Table 1). The waterfowl group (e.g. ducks, geese, swans) was the most common group detected with a total of 1,167 birds and a mean of 20.1 birds/survey unit. Waterbirds (e.g. loons, cormorants, bitterns, herons, gulls and terns) were the second most frequently detected group with a mean of 5.5 birds/survey unit and a total of 318 birds. The raptors were the third most frequently detected group with a total of 225 birds recorded and a mean of 3.9 birds/survey unit. Finally, 171 observations of corvids (ravens and crows) were documented with a mean of 2.9 bird/survey unit (Table 2).

**Table 1.** Large bird abundance and richness in the Adams Point project area. Data were collected in Fall 2013 at two large bird survey sites. Large birds include corvids, raptors, waterbirds, and waterfowl.

Large Bird Surveys	
No. Species	28
No. Individuals	1,881
Mean No. Birds / Survey	32.4

**Table 2.** Mean bird abundance in the Adams Point project area. Data were collected in the Fall of 2013 at two large bird survey sites. Large birds include corvids, raptors, waterbirds, and waterfowl.

Group	Mean Birds/Survey Unit	Total No.
Corvids	2.9	171
Raptors	3.9	225
Waterbirds	5.5	318
Waterfowl	20.1	1,167

The most frequently observed waterfowl species were the common merganser, mallard as well as large groups of migrating ducks that could not be identified at the distance from which they were detected. Observers noted large flocks of migrating waterfowl from mid-to late-October with daily counts ranging from the 100's to nearly 600. The most commonly recorded waterbird was the ring-billed gull, which is not surprising due to the proximity of the project area to Lake Huron. The bald eagle was by far the most frequently recorded raptor with a total of 189 sightings. It is important to note that these sightings do not represent unique individuals and it is assumed that many of the same eagles were recorded flying in the project area multiple times throughout each day. One observer noted 16 individual bald eagles, including adults and juveniles near the mouth of the Swan River during the salmon run in mid-October. In addition, one observation of a golden eagle and eight observations of the state threatened merlin were documented during large bird surveys (Table 3.).

**Table 3.** Avian abundance and richness in the Adams Point project area. Data were collected in the Fall of 2013 at two large bird survey stations.

<b>Species Arranged by Group</b>	<b>No. Birds</b>	<b>Status</b>
<b><u>Waterfowl</u></b>		
American Black Duck	13	
Canada Goose	35	
Common Goldeneye	7	
Common Merganser	235	
Hooded Merganser	2	
Long-tailed Duck	3	
Mallard	135	
Mute Swan	4	
Red-breasted Merganser	10	
Unknown Duck (too far to id.)	692	
White-winged Scoter	19	
<b><u>Waterbirds</u></b>		
Double-crested Cormorant	7	
Great Blue Heron	2	
Herring Gull	36	
Ring-billed Gull	162	
Sandhill Crane	14	
Unknown Gull	55	
Unknown Shorebird	40	
<b><u>Raptors</u></b>		
Bald Eagle	189	State Special Concern
Golden Eagle	1	
Merlin	8	State Threatened
Northern Harrier	1	State Special Concern
Rough-legged Hawk	1	
Turkey Vulture	15	
Unknown Buteo	2	
UNK Raptor	8	
<b><u>Corvids</u></b>		
American Crow	113	
Common Raven	58	

### **Large Bird Flight Behavior in the Project Area: Fall 2013**

During large bird migration surveys, we recorded a total of 617 “eagle minutes”. In addition, 102 “eagle minutes” were recorded during incidental observations and 9 “eagle minutes” were recorded during point count surveys for small birds for a total of 728 “eagle minutes” during the fall migration season (Table 4).

**Table 4.** Number of “eagle minutes” recorded in the Adams Point Project Area. Data were collected in the Fall of 2013 at two large bird survey sites, 9 point count stations and incidental observations.

<b>Bald Eagle Observations</b>	<b>No. of “Eagle Minutes”</b>
Large Bird Surveys	617
Incidental Observations	102
Small Bird Surveys	9
All Surveys Combined	728

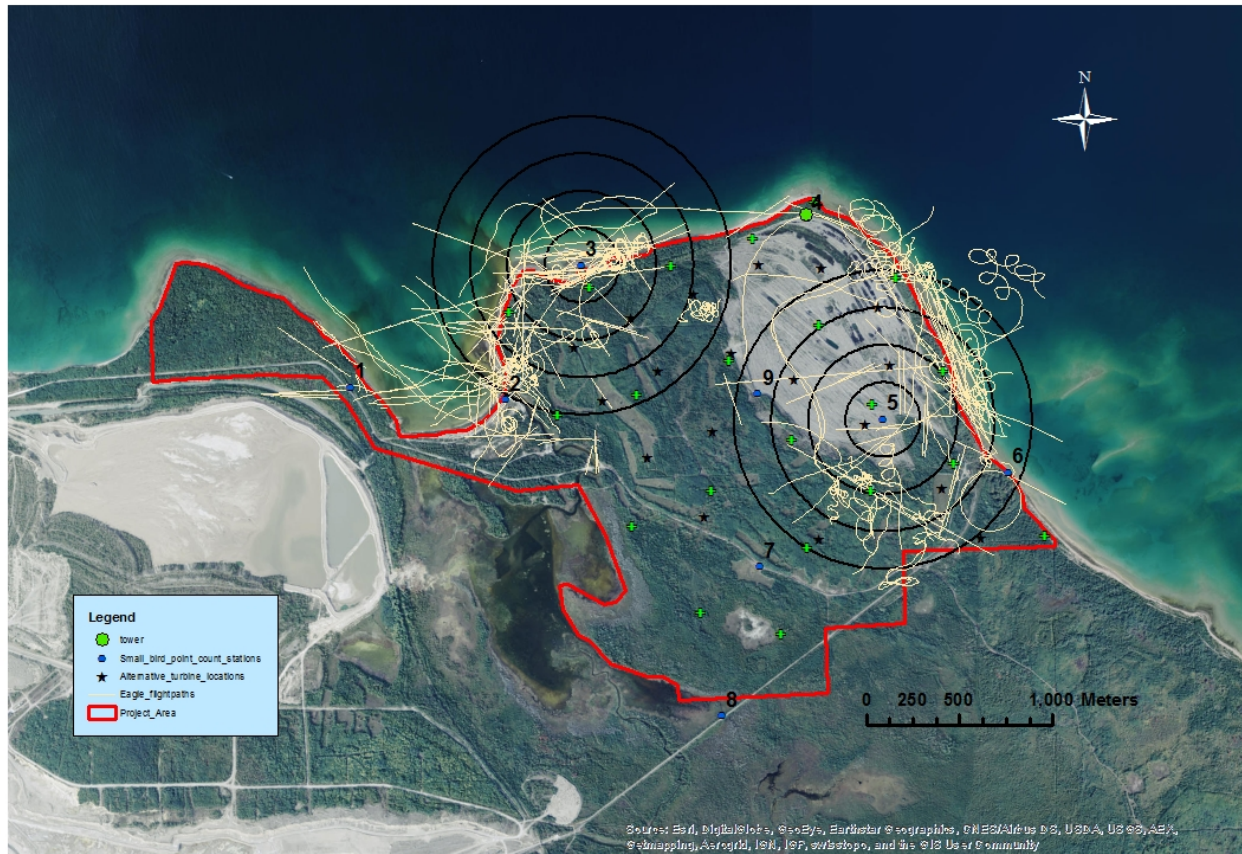
Assuming that the wind turbine RSA is  $\leq 200\text{m}$  in height, 98.7% of all bird observations were within the RSA, and 1.2% of observations were above the RSA. The percentage of bald eagles flying within the RSA was 98.4% while 1.6% of bald eagle observations were above the RSA. The mean altitude of all birds observed during fall migration was 54.2m. The daily mean of all birds recorded ranged from 17m to 102m with a median of 50m. The mean altitude of bald eagles observed was 64.7m. The daily mean of eagles observed ranged from 13.3m to 134.4m. with a median of 51.6m.

**Table 5.** Mean altitude (meters) of bald eagles and all birds observed in flight within the Adam’s Point project area.

<b>Flight Behavior</b>	<b>Mean Altitude (m)</b>	<b>Median Altitude (m)</b>
Bald Eagles	64.7	51.6
All Birds	54.2	50.0

### **Bald Eagle Flight Path Analysis**

A comprehensive analysis of the bald eagle flight path data was not conducted as it was outside of the project scope. A review of the flight path map (Figure 6.) reveals that most of the eagles observed from the large bird stations #3 and # 5 were documented flying in the vicinity of the Lake Huron shoreline and along the Swan River. In particular, many eagles were seen on the wing along the shore east of Adams Point, within Swan Bay and flying to and from Swan Lake. In addition, many eagles were observed in flight south of station #5. It is likely that eagle activity in the center of the project area is underrepresented since there was not a large bird viewing station located in this area. Further examination of the data associated with the eagle flight paths (e.g. approximate flight altitude, “eagle minutes”) may provide additional insights that could assist in conducting a threat analysis for this proposed project.



**Figure 6.** Flight paths of eagles were digitized to depict the area where they were recorded in Fall 2013.

In reviewing the Fall 2013 large bird survey data, it appears that the Adam's Point project area provides migratory stopover and foraging habitat for bald eagles in the fall. During the period that the salmon were migrating up the Swan River (Oct 1-15), large numbers of bald eagles were observed in the vicinity of the Lake Huron shoreline and at the mouth of the Swan River feeding on salmon (Figure 7). In addition, large flocks of migrating waterfowl were observed in mid- to late-October flying southeast along the shoreline as well as across the project area, especially in the vicinity of Swan Lake. Numerous eagles were also recorded near Swan Lake. The concentration of fish and waterfowl present in October is likely responsible for the large number of eagles utilizing the area. These preliminary data suggest that the flight behavior of bald eagles as well as other large birds recorded in the project area puts them at risk of collisions. It is important to note that very few large groups of migrating raptors were seen flying unidirectionally in the vicinity of the project area. Adam's Point may not be an important funneling area for large groups of migrating raptors passing through the area but appears to provide important foraging and stopover habitat for specific groups of migrating birds, most specifically bald eagles.



**Figure 7.** Large numbers of migrating salmon were observed in early to mid-October swimming in Lake Huron and in the Swan River. Numerous observations of eagles feeding on salmon were documented.

**Small Bird Surveys: Fall 2013**

A total of 771 individuals (43 bird species) were recorded during Fall 2013 surveys with a mean number of 17.9 birds observed during each 10-minute survey (Table 6). The most common groups observed were waterfowl, waterbirds, corvids and snow buntings (Table 7). Because the surveys did not start until after mid-September, it is likely that some groups of migrating songbirds departing from areas north from late-August through mid-September were not observed. In addition to observations of 28 bald eagles during small bird surveys, three observations of the state threatened merlin and one observation of the state special concern northern harrier were recorded (Table 8).

**Table 6.** Songbird abundance and richness in the Adam’s Point project area proposed for wind energy development . Data were collected in the Fall of 2013 at 9 point count stations.

<b>Small Bird Surveys</b>	
No. Species	43
No. Individuals	771
No. of Surveys	43
Mean No. Birds / Survey	17.9

**Table 7.** Mean bird abundance in the Adam's Point Project Area proposed for wind energy development. Data were collected in the Fall of 2013 at nine point count stations.

<b>Group</b>	<b>Mean Abundance</b>	<b>Total No.</b>
Chickadees/Nuthatches	1.3	56
<b>Corvids</b>	<b>3.2</b>	<b>139</b>
Finches/Allies	0.11	5
Kingfishers	0.05	2
<b>Longspurs/Snow Buntings</b>	<b>1.72</b>	<b>74</b>
Passerine (Unknown)	0.09	4
Raptors	0.77	33
Sparrows	0.42	18
Thrushes	0.23	10
Vireos	0.07	3
Warblers	0.16	7
Waterbirds	3.88	<b>167</b>
<b>Waterfowl</b>	<b>5.07</b>	<b>218</b>
Waxwings	0.23	1
Woodpeckers	0.47	20
Wrens/Kinglets	0.33	14
<b>Total</b>		<b>771</b>

**Table 8.** Avian abundance and richness in the Adams Point Project Area Data were collected in the Fall of 2013 at nine point count stations

<b>Species Arranged by Group</b>	<b>No. Birds</b>	<b>Status</b>
<b><u>Chickadees/Nuthatches</u></b>		
Black-capped chickadee	32	
Red-breasted nuthatch	22	
White-breasted nuthatch	2	
<b><u>Corvids</u></b>		
American Crow	44	
Blue Jay	78	
Common Raven	17	
<b><u>Finches/Allies</u></b>		
American goldfinch	2	
Pine siskin	3	
<b><u>Kingfishers</u></b>		
Belted kingfisher	2	
<b><u>Longspurs/Snow Buntings</u></b>		
Snow bunting	74	
<b><u>Raptors</u></b>		
Bald Eagle	28	State Special Concern
Merlin	3	State Threatened
Northern Harrier	1	State Special Concern
Red-tailed hawk	1	



**Table 8. Continued.**

**Passerine**

Unknown passerine 4

**Sparrows**

American tree sparrow 3

Dark-eyed junco 2

Swamp sparrow 11

Unknown sparrow 1

White-throated sparrow 1

**Thrushes**

American robin 10

**Vireos**

Red-eyed vireo 3

**Warblers**

Yellow-rumped warbler 1

Unknown warbler 6

**Waterfowl**

Canada Goose 17

Common Merganser 55

Mallard 6

Red-breasted Merganser 10

Unknown Duck (too far to id.) 54

Unknown Merganser 75

Unknown Teal 1

**Waterbirds**

Double-crested Cormorant 1

Common loon 2

Herring Gull 3

Ring-billed Bull 115

Sandhill Crane 10

Unknown Gull 36

**Waxwings**

Cedar waxwing 1

**Woodpeckers**

Downy woodpecker 4

Hairy woodpecker 4

Northern flicker 11

Pileated woodpecker 1

**Wrens/Kinglets**

Ruby-crowned Kinglet 6

Golden-crowned Kinglet 2

Unknown Kinglet 3

Sedge Wren 2

Winter Wren 1

### **Winter Surveys of Non-breeding eagles: 2013-2014**

On December 5, 2013, one immature bald eagle was observed at Point #6 flying north from the shoreline over Lake Huron. Two adult bald eagles were documented near the bridge and along the Swan River on December 7, 2013. One eagle was perched and then flew south along the Swan River while the other was observed flying NNW from Point #2 over Lake Huron. On December 19, 2013, one immature bald eagle was observed just south of the bridge at the Swan River flying north at 30m high. No eagles were observed on December 20, 2013 or on January 14, 2014. Although several bald eagles were seen near the Swan River in the western portion of the project site during limited winter surveys in 2014 (a total of 3 “eagle minutes”) it does not appear that this area is an important winter concentration area for bald eagles. Because access to the entire site was limited due to deep snow and impassable roads, it is unclear whether other areas of the project site provide habitat for winter concentrations of eagles. Additional winter surveys using snowmobile, aerial surveys or other means to access the entire site are recommended.

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