Avian Studies for the Nugent Sand Company Wind Power Project: Summary of 2008 Spring Field Season

Prepared By:
Joelle Gehring, Ph.D.
Senior Conservation Scientist-Zoology Section Leader
Michigan State University, Michigan Natural Features Inventory
P.O. Box 30444 Lansing, MI 48909-7944

Prepared For:
Alternate Energy Solutions, Inc.
Gratiot Office Plaza - 2nd Floor, 23801 Gratiot Ave.
Eastpointe, MI 48021

27 October 2008
2008-21

MICHIGAN STATE UNIVERSITY EXTENSION

Introduction

Many areas near the shorelines of the Great Lake's possess winds adequate for the efficient generation of wind energy. These shorelines have also been documented to provide important migration corridors for migratory raptors and waterfowl. Although the Nugent Sand Company area is an active mining site, waterbirds, raptors, and waterfowl traverse this area of the Michigan during migration. Due to the potential for avian collisions with wind turbines the value of this research is heightened by the general importance of shoreline area to birds.

The research detailed in this report was conducted in order to determine the avian use of an area proposed for wind power development in Muskegon County. These data and data collected this fall will be combined and completely analyzed for inclusion in the subsequent report. This information will help wind energy developers and resource managers to make appropriate decisions regarding the potential impacts to birds and the methods in which they might reduce those impacts.

Study Site and Methods

Study site and description

Research was conducted in Muskegon County, located in west-central Michigan, USA. The specific study area is actively mined for sand, a process that has created two inland water bodies. Much of the remaining project area is forested Lake Michigan shoreline with dunes and beach habitats as well (Fig. 1).

Large bird surveys

We established a raptor and other large bird viewing station near the center of the project area. This station, placed next to a meteorological monitoring tower, provided a good viewshed of the proposed project site, given the vegetation openness and slight elevation compared to other areas (Figs. 1, 2). Following methods similar to those used by Hawkwatch International, we conducted 6-hour surveys at this station in April and May 2008. Data will also be collected in September, October, part of November 2008 and a combined report will be prepared for both seasons after data collection is complete. When conducting weather-dependent research, some flexibility in scheduling is needed and some surveys were missed due to inclement conditions.

During surveys each raptor, large bird, and sensitive status species was recorded in addition to the bird's flight path, flight direction, approximate flight altitude (lowest and highest flight altitude), whether it flew within the proposed project area, and the distance to each bird. Technicians used landmarks as reference when measuring distance to birds and flight altitude. Technicians also recorded the behavior and habitat use of each bird. Behavior categories were as follows: perched (PE), soaring (SO), flapping (FL), flushed (FH), circle soaring (CS), hunting (HU), gliding (GL), and other (OT, noted in comments). Any comments or unusual observations were also noted. Weather data were collected in concert with large bird surveys; specifically, temperature, wind speed, wind direction, and cloud cover. The date, start, and end time of the observation period, species or best possible identification, number of individuals, sex and age class, distance from plot center when first observed, closest distance, height above ground, activity, and habitat(s) were recorded.

Rare species query of NatureServe database

A query of Michigan Natural Features Inventory's NatureServe database for Element Occurrences (i.e., locations of previously detected rare and declining species) found several records for animal species nearby but not in the specific project area. Records for animal Element Occurrences require that birds show evidence of breeding at the location (NatureServe 2008).

The records for the Prairie Warbler (*Dendroica discolor*) and Piping Plover (*Charadrius melodus*) were approximately 2 km north of the project area. However, these species should be considered in project activities by minimizing disturbance in appropriate habitats. Both the Piping Plover and Prairie Warbler are listed as endangered species and use specific habitats currently present in the project area. The Piping Plover specializes in using beaches and shoreline areas (Hyde 1999a). In Michigan, the Prairie Warbler is found most frequently in scrub-shrub dune areas along the lake shores; however, they have also been found in large areas of inland scrub-shrub (Cooper 2000). Minimizing the fragmentation of large tracts of their preferred habitats is an important part of this species' conservation. No Piping Plovers or Prairie Warblers were detected or observed in the proposed project site during our survey visits.

Results and Summary

Large bird surveys

Preliminary data analysis determined that during the 31 large bird surveys conducted in the spring of 2008 observers detected 9,806 large birds of 48 species (excluding gulls). There was a mean of 316 birds detected per survey (53.4 birds / hour; Table 1). During these spring surveys the waterbird group (e.g., Double-crested Cormorants (*Phalacrocorax auritus*) but not including gulls for these analyses) was the most abundant of the bird groups detected per survey (161.0 birds / survey, 27.2 birds / hour; Fig. 3), followed by waterfowl (118.8 birds / survey, 20.1 birds / hour, Fig. 4), and then raptors (22.3 birds / survey, 3.8 birds / hour; Fig. 5).

The mean flight altitude of raptors was 108.9 m above ground level. Assuming the wind turbine rotor-swept area (RSA) would be 35 – 125 m above the ground, 14.9% of birds in the spring flew below the RSA, 55.6% within the RSA, and 29.5% above the RSA. Migrating raptors generally followed very similar flight paths along the predominantly forested shoreline dune system running north and south, with greater abundance to the east of the observation site than to the west. While not the most common species group, raptors are frequently the focus of concerns related to wind turbine construction and have been demonstrated to be involved in collisions with wind turbines more frequently than other avian groups. Waterfowl were more abundant to the west of the observation site over, in, and near Lake Michigan. However, the inland lakes resulting from mining operation attracted waterfowl into the project area. Double-crested Cormorants (most common waterbird detected) frequently flew from Lake Michigan to a nesting rookery located less than 3 km southeast of the observation site (Fig. 1). Waterbirds and waterfowl do not collide with wind turbines as frequently as other bird species groups and have been demonstrated to avoid turbines in flight.

Given the high numbers of migrating large birds moving through this area and the potential for a high proportion of them flying within the RSA it is appropriate to utilize the additional data that we are currently collecting at the site in order to better understand the movement of birds through the area during their migration south. In the subsequent report we will accumulate flight path data from those species of sensitive status (e.g., threatened, endangered) for both the spring and fall and thereby provide more a complete

description of their use of the area. Additional recommendations can be made at that time. At this stage of the data collection, the site does not appear to have unique characteristics putting it at higher risk for avian collision hazards than other areas where wind turbines are installed.

Table 1. Avian abundance and richness in Muskegon County, MI in a site proposed for the development of wind energy. Data were collected in the spring of 2008 at a large bird survey site.

	Large Bird Survey Spring 2008
No. Individuals	9806.0
No. Species	48.0
Mean No. Birds / Survey	316.0
Mean No. Birds / Hour	53.4

Table 2. Mean bird abundance in Muskegon County, MI in a site proposed for the development of wind power. Data were collected in the spring of 2008 at a large bird survey site.

Group	Mean Abundance [a]
Waterbirds	161.0
Waterfowl	118.8
Raptors	22.3

[a] Mean Abundance = mean number of individuals observed per survey

Table 3. Raptor abundance and richness in Muskegon County, MI in and around a site proposed for the development of wind power. Data were collected in the spring of 2008 at a large bird survey site.

Species	No. Birds Spring 2008	Conservation Status
American Kestrel	10	
Bald Eagle	29	Threatened
Broad-winged Hawk	11	
Cooper's Hawk	16	Species of Special Concern
Merlin	4	Threatened
Northern Harrier	41	Species of Special Concern
Osprey	6	Threatened
Peregrine Falcon	3	Endangered
Red-tailed Hawk	69	
Rough-legged Hawk	2	
Sharp-shinned Hawk	38	
Turkey Vulture	384	
Unknown raptor	61	

Acknowledgments

C. Dykstra collected the much of the data for this project. I would like to express my gratitude to R. Chandonette (Nugent Sand Company) and J. Wolar (Alternative Energy Solutions) for their collaboration and funding. My colleagues at the Michigan Natural Features Inventory provide logistical and technical support; especially, Yu Man Lee, Sue Ridge, Nancy Toben, Rebecca Rogers, and Helen Enander.

Literature Cited

Cooper, J. 2000. Special animal abstracts for *Dendroica discolor* (Prairie Warbler). Michigan Natural Features Inventory, Lansing, MI.

Hyde, D. 1999a. Special animal abstracts for *Charadrius melodus* (Piping Plover). Michigan Natural Features Inventory, Lansing, MI.

Johnson G. D., W. P. Erickson, M. D. Strickland, M. F. Shepherd and D. A. Shepherd. 2000. Avian Monitoring Studies At The Buffalo Ridge, Minnesota Windresource Area: Results Of A 4-Year Study. Technical report prepared for Northern States Power Company, 414 Nicollet Mall, 8th Floor Minneapolis, Minnesota 55401.

NatureServe. 2008. Natural Heritage Methodology. http://www.natureserve.org/prodServices/heritagemethodology.jsp

Reynolds, R.T., J.M. Scott, and R.A. Nussbuam. 1980. A variable circular-plot methods for estimating bird numbers. Condor 82:309-313.

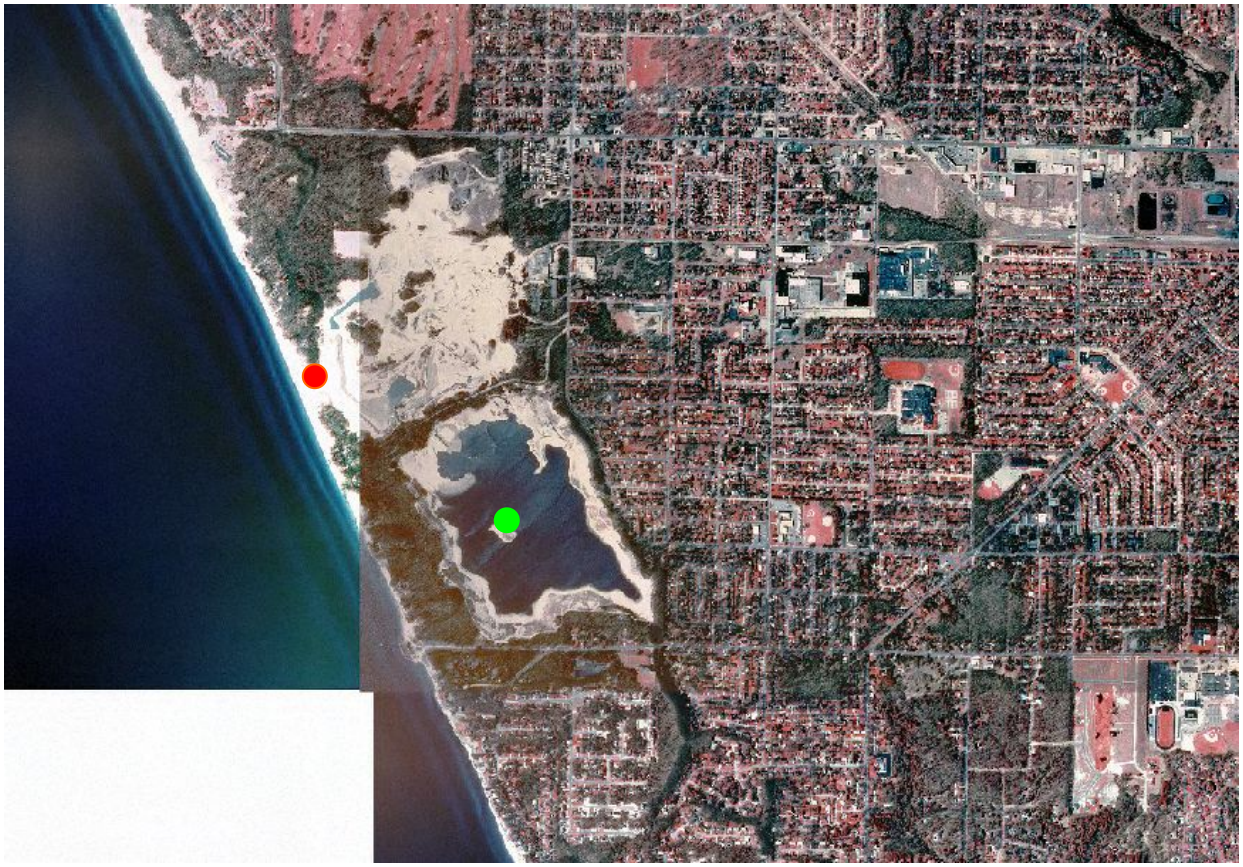

Figure 1. Wildlife surveys were conducted in Muskegon County, Michigan, in a site proposed for wind energy development. The red dot identifies the site of large bird data collection. The green dot identifies the site of the nesting rookery.

Figure 2. We conducted large bird surveys for proposed for wind energy development in Muskegon County, Michigan. The open area near a meteorological monitoring tower provided the best possible view shed of the project area. The site was surveyed in April and May 2008.

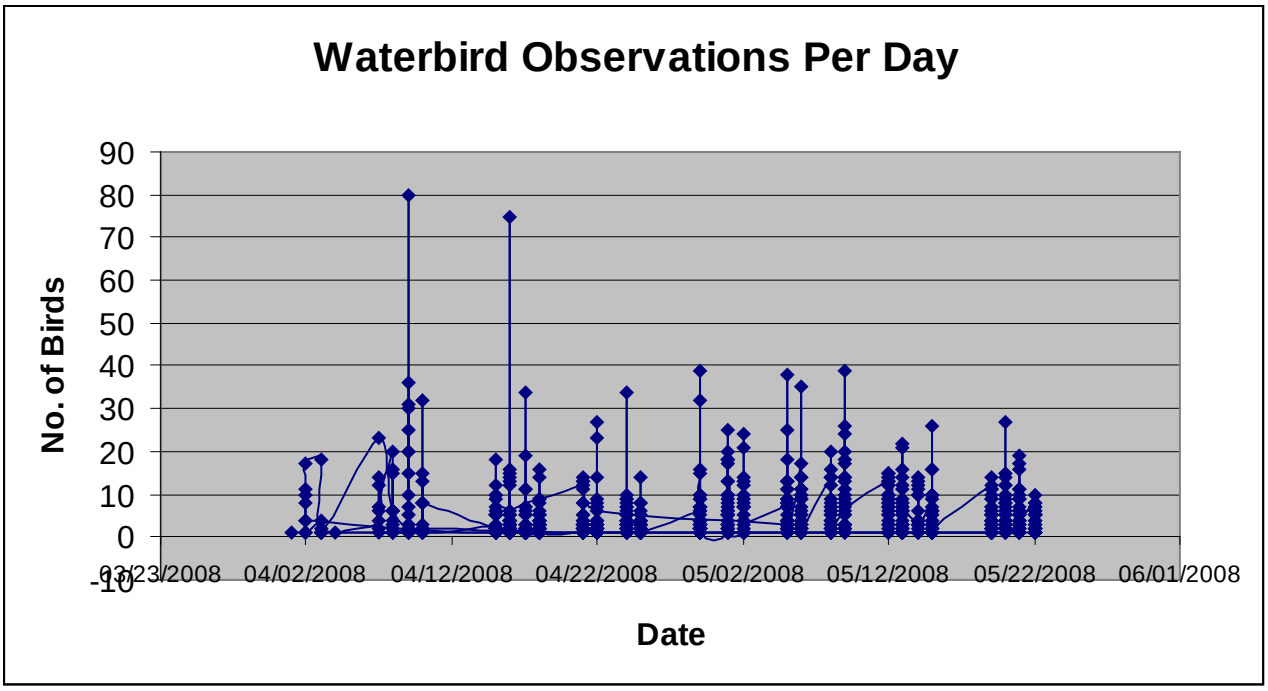

Figure 3. Large bird surveys were conducted in Muskegon County, Michigan and the numbers of waterbirds observed were quantified by survey day. Surveys were conducted in April and May 2008.

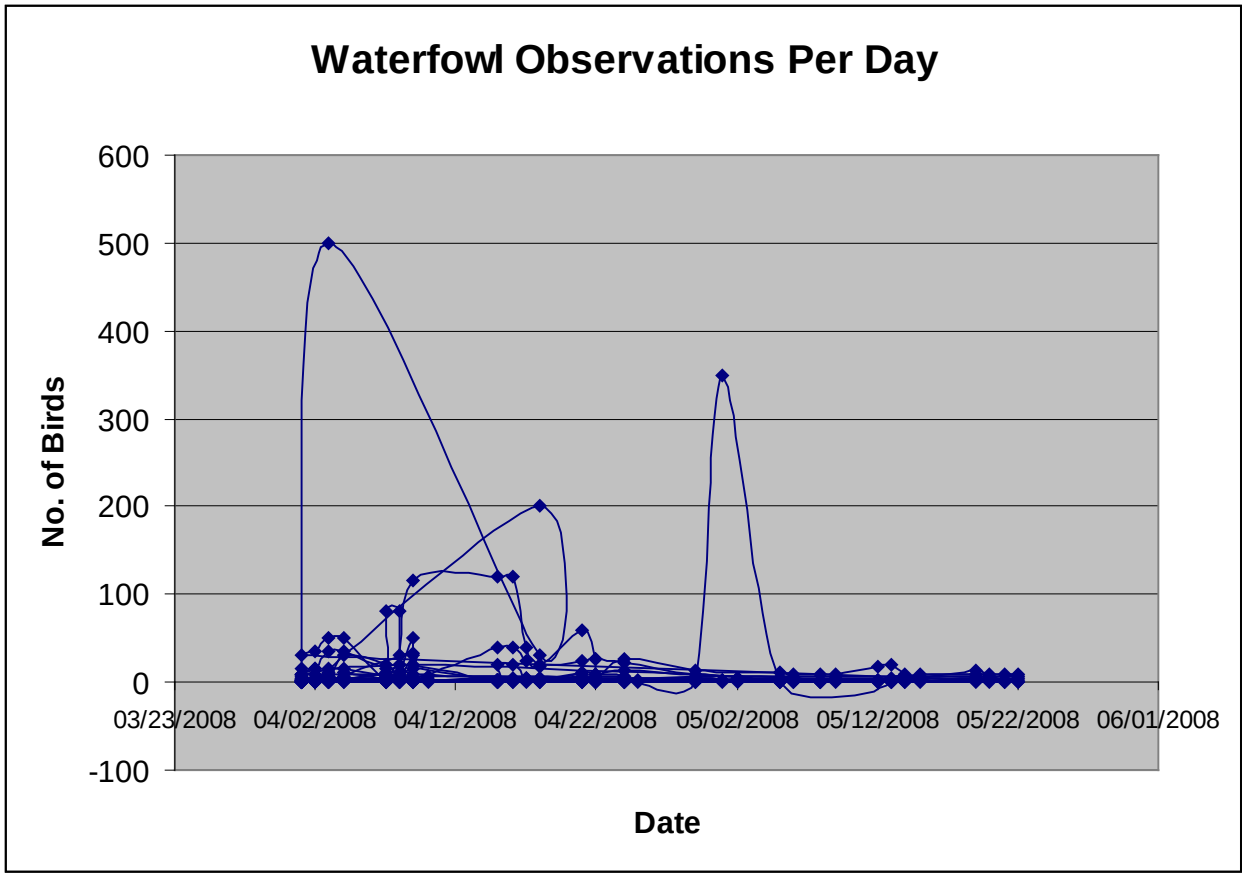

Figure 4. Large bird surveys were conducted in Muskegon County, Michigan and the numbers of waterfowl observed were quantified by survey day. Surveys were conducted in April and May 2008.

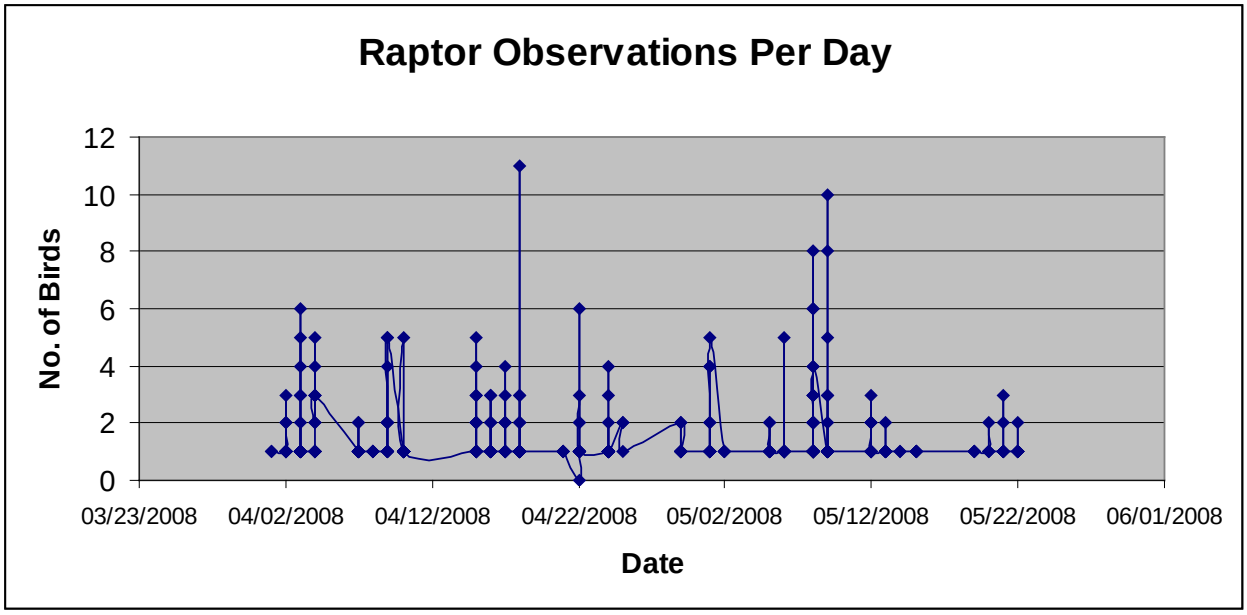

Figure 5. Large bird surveys were conducted in Muskegon County, Michigan and the numbers of raptors observed were quantified by survey day. Surveys were conducted in April and May 2008.