APPENDIX P.6

Diurnal Bird Movement Study

2008 Diurnal Bird Movement Study on Big Galloo Island, Jefferson County, NY

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Summary

43 diurnal bird movement surveys were carried out on Big Galloo Island from late March through mid-November, 2008. The goal was to assess avian flight activity and flight characteristics (e.g., altitude & direction) over Big Galloo Island with particular attention toward the Little Galloo Island colonial waterbirds -- gulls, Caspian Tern, and Double-crested Cormorant. Flight activity of all species above 30 m above ground level was noted.

These surveys were carried out at least once a week from April 24 – October 16, and approximately biweekly prior to and after that period. Primary surveys consisted of at least 20-minute observation periods from five fixed points distributed along the length of the island. These were carried out in the morning and late in the day on a regular basis. Secondary surveys were made in a roving manner around the island to study numbers and flight characteristics of migratory landbirds.

Little Galloo colonial waterbirds were documented to make regular feeding flights across Big Galloo Island. The flights were noted throughout the crepuscular and daylight period beginning as soon as the colonial waterbirds arrived on Little Galloo in spring and continuing until they dispersed in mid- to late summer.

The mean passage rate of Little Galloo colonial waterbirds across Big Galloo was: Ring-billed Gull - 265.6 birds/km/hr from late March through July; Double-crested Cormorant - 21.1 birds/km/hr from late March through September; Caspian Tern - 16.8 birds/km/hr from late April through mid-August. Flight passage rate was not uniform across the island and for each of these three species was generally lower across the middle portion of the island and higher toward either end.

Morning movements of nocturnal migrant landbirds as well as diurnal migrant landbirds were documented on several surveys in the spring and fall migration periods. Diurnal migrant landbirds (e.g., Blue Jays, Blackbirds) were noted following the shoreline around the island. Nocturnal migrants in morning flight were observed to proceed as far as they could in their intended migration direction, either north in spring or south in fall. When they reached the end of the island, a typically reaction was to turn around and fly the other direction down the center of the island.

No flight activity of waterfowl (ducks or geese) or waterbirds was noted between the north bay of the island and the northern pond/marsh area.

Introduction

Big Galloo Island (Town of Hounsfield, NY) is a 2000-acre island 40 km west of Watertown, NY and 20 km west of Sackets Harbor, NY (Fig.1). This report presents results from a diurnal bird movement study on Big Galloo Island that occurred in 2008. The study was part of the SEQRA and Article VII review processes for the proposed Hounsfield Wind Energy Project on Big Galloo and was outlined in task 7 of the Big Galloo Bird & Bat Workplan (Old Bird, Inc. 2007). This wind project is proposed to consist of up to ninety 3.0 megawatt (MW) wind turbines each having a hub height of 80 meters (262 ft), a rotor diameter of 90 m (295 ft), a maximum height of 125 m (410 ft), and a rotor-swept zone extending from 35-125 m (114-410 ft) above ground level (agl).

Fig. 1. Location of Big Galloo Island in the northeastern Lake Ontario region.

The general objective of this study was to characterize flight patterns of birds during the day for assessing potential avian collision risk with the project's wind turbines and for gathering baseline data that could be compared to similar data if the project is constructed. The latter information would be used to document whether the wind project caused a change in bird flight patterns over the island.

The primary purpose of this study was to assess the flight activity over Big Galloo Island of the waterbirds breeding on Little Galloo Island. Little Galloo is a 43-acre island about 1500 m (~ 1 mile) southeast of Big Galloo that hosts a large colonial waterbird rookery (see Figs. 1 & 2). It is part of the New York State designated Lake Ontario Islands Bird Conservation Area and has one of the largest Ring-billed Gull rookeries in North America, a significant Herring Gull rookery, one of two (and the largest) Caspian Tern rookery in New York, and a population of nesting Double-crested Cormorants that is currently managed by the New York Department of Environmental Conservation (NYDEC) at about 1500 nesting pairs. No prior information exists regarding what extent these four primary nesting species on Little Galloo make flights over Big Galloo Island and, therefore, might be at risk from the proposed wind project.

A second purpose of this diurnal bird movement study was to document any unique avian flight characteristics that may be caused by the island geography of the wind project site. Most of the recently proposed wind energy projects in NY have been located in the interior of the state. In such cases with flat terrain, the diurnal flight behavior of birds is presumed to be relatively uniform - for example, the morning flight of night-migrant passerines and the diurnal flight behavior of swallows and migrant Blue Jays (and other diurnal migrant landbirds). No information on the diurnal flight behavior of birds on islands in eastern North America was available for inclusion in this report, but there are reports of concentrated diurnal movements of landbirds in proximity to large waterbodies – for example the morning flights at Cape May, NJ (Weidner et al. 1992) and at the Derby Hill Bird Observatory on the south shore of Lake Ontario in spring (W. Evans, pers. obs., G. Smith, pers. comm.).

A third purpose of this study was to document to what extent flight activity of waterbirds exists between the large pond/marsh area at the north end of the Big Galloo Island and the island's prominent north bay (called "North Pond" in Fig. 1).

Methods

The proposed methods for this diurnal bird movement study were outlined in Task 7 of the Big Galloo Island Bird and Bat Work Plan (Old Bird, Inc. 2007). To characterize the flight patterns of the Little Galloo colonial waterbirds, five observation sites were established along the southeastern side of Big Galloo (Fig. 2). Visual counts of flying gulls, cormorants, Caspian Terns, and other species were made during 20 or 30-minute observation periods at each site (hereafter termed the "five-point survey"). The surveys were performed consistently at two different times of day from Spring through Summer 2008. William Evans (Director of Old Bird, Inc.) and Bob McGuire, an experienced birder from Ithaca, NY carried out the surveys.

The surveys targeted birds crossing the airspace from roughly 500 m to the northeast to roughly 500 m to the southwest of an observation site (~ 1-km span). The numbers of flying birds, their species or species group, their flight altitude, and flight direction were noted. Observations typically began in early morning (within an hour after sunrise) and late afternoon (at least an hour before sunset) at either point 1 or point 5. The surveyor then proceeded sequentially to adjacent survey points via an ATV with a 5- to 10-minute travel time between points.

One five-point survey was carried out per day. Typically a surveyor would arrive on the island in the afternoon and carry out a five-point survey in the late afternoon & early evening period. The surveyor would spend the night on the island and then carry out another five-point survey in the morning of the next day. Daily data were tallied from all points and a mean passage rate was determined by dividing the total from all points by the number of survey points (5 on most days). Since the survey area had an approximately one-kilometer length and since most birds were flying across this span (not parallel to it), an approximate passage rate of birds flying across the observation space was estimated in birds per kilometer per hour. Initial survey periods in late March and early April were 30 minutes but in late April this was shortened to 20 minutes to make the adjacent survey periods more contemporaneous.

For example, the mean passage rate of Ring-billed Gulls on the survey of June 5 was determined by adding up the Ring-billed 20 minute totals seen from the five observation points. The first survey was begun at point 1 beginning at 6:40PM and the

last survey at point 5 was completed at 9:00PM. Point totals of 99, 114, 81, 86, and 191 were tallied respectively from points 1-5 -- a total of 541 Ring-billeds with a mean of 108 per point. Since that mean was for a 20-minute span, the hourly mean was determined by multiplying by three: 325 Ring-billed Gulls per kilometer per hour.

For such figures, the hour is precise to an estimated +/- 15 seconds. As noted, the kilometer survey range is a rough estimate. It has a likely error in the range of +/- 0.25 km due to the difficulty in judging the distance of birds at the far perimeter of a survey area. Similarly, the estimated altitude above ground level for birds was a rough estimate with greater error at higher altitudes. At three of the survey points, nearby 60-m met towers could be used for reference. Finally, it should be noted that the number of birds tallied is not the actual number that crossed the observation area but the number noted by the surveyor. On days with heavy gull traffic, it was difficult for a surveyor to detect every gull passing. In general, birds closer to the observer were more accurately tallied than birds at one end or the other of the survey area. This was especially true for distinguishing Caspian Terns from gulls. Also, sometimes birds could be overlooked when they passed directly overhead while a surveyor was busy counting to either side. The accuracy of tallying gulls and terns against the sky varied depending on whether they were backlit or not and whether the sky was clear or cloudy.

The five-point surveys were completed either in mid-morning or around dusk. Occasional mid-day counts were also performed. Observations from these five points began in late March 2008 and continued approximately weekly through July. Beginning in August, surveys from the five points were carried out less often because the Little Galloo nesting colonies had largely dispersed. Attention shifted to documenting morning flight of passerines as well as continued observations of raptors and other species flying in the airspace over the island (> 30 m above ground level). These latter surveys consisted of observations made during an ATV trip around the perimeter of the island. On occasions when morning flight of landbirds was noted, point surveys of passage rates, flight altitude, and flight direction were documented.

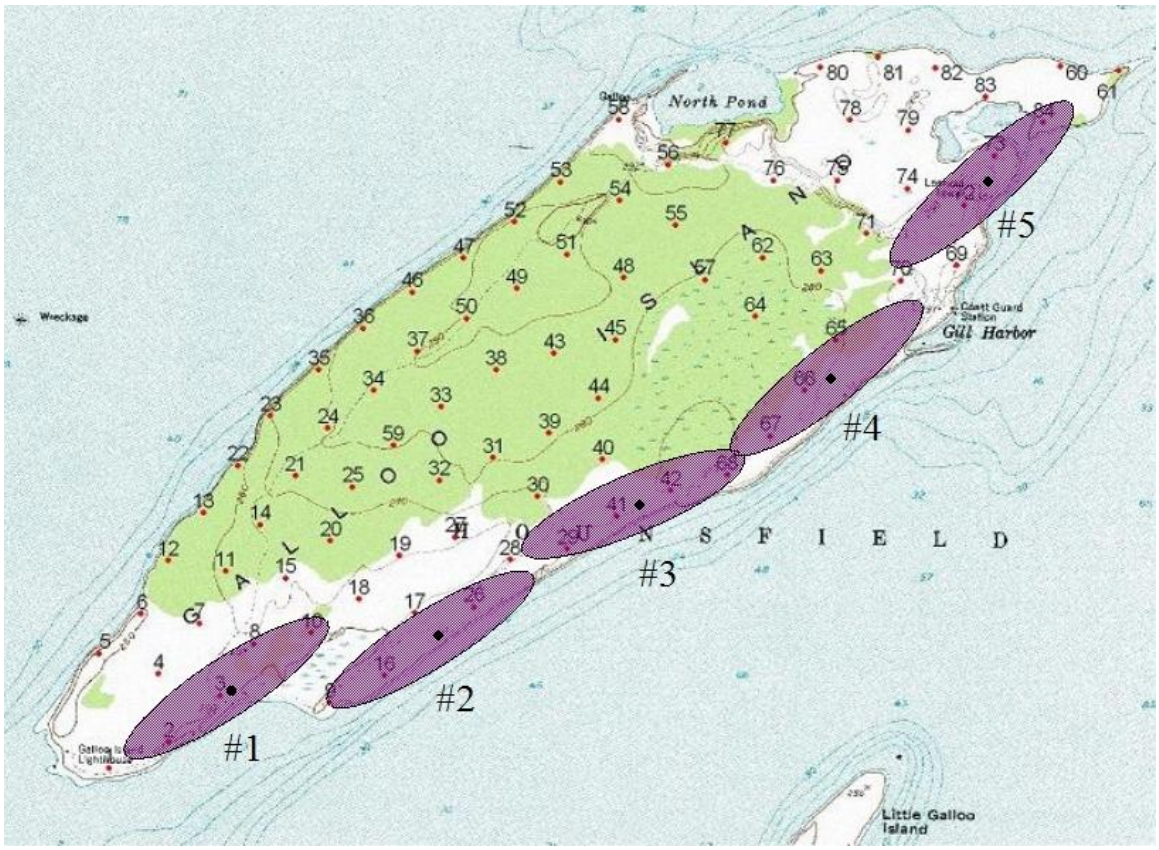

Fig. 2. Locations (black dots) and approximate observer survey range (purple ovals) of the five count sites used for the diurnal bird movement survey. Surveyor observation range covered approximately 1000 m (length of purple ovals). Numbered red dots are proposed wind turbine locations.

RESULTS

Surveys of diurnal bird movements on Big Galloo Island were made on 43 days from late March through mid-November 2008 (Table 1). From late March through July, the primary focus was documenting flight activity from the five survey points shown in Fig. 2. However, on four survey days in May, fallouts of spring migrant landbirds occurred on the island and the survey routine shifted to document their flight behavior across the whole island. After July when the colonial waterbirds on Little Galloo had largely dispersed, attention shifted to documenting diurnal landbird movements and raptor and waterfowl flight activity over the island.

Passage rates of Little Galloo colonial waterbirds

Ring-billed and Herring Gulls

Because of the difficulty in identifying the species of distant gulls in the five-point surveys (Fig. 2), flight activity of Ring-billed and Herring Gulls was lumped into the general category of Gulls. Since the vast majority of gulls were noted to be Ring-billeds, the statistics presented here are reported as Ring-billed Gull with the understanding that small numbers of Herring Gulls are included.

The first Ring-billed Gull flight activity in the vicinity of Big Galloo was noted in mid-March and regular transit across the island was occurring by the time of the first five-point survey on March 27. Fig. 3 shows mean passage rates of Ring-billed Gulls per five-point survey. A mean passage rate of over 100 gulls/km/hr was noted in the first morning survey on March 27. Mean passage rates peaked between 300-600 gulls/km/hr from June through early July. By early August the Ring-billed Gull transit across Big Galloo had nearly ceased as the bulk of the Little Galloo Ring-billed colony had dispersed.

A survey on the afternoon July 17 could not document transit numbers because thousands of gulls were flying in all directions over the center of the island feeding on flying ants. Also not shown in Fig. 3 are several mid-day counts that confirmed that Ring-billed Gull transit occurred all day long. These mid-day transit observations were also confirmed during the breeding bird survey periods in late May and late June.

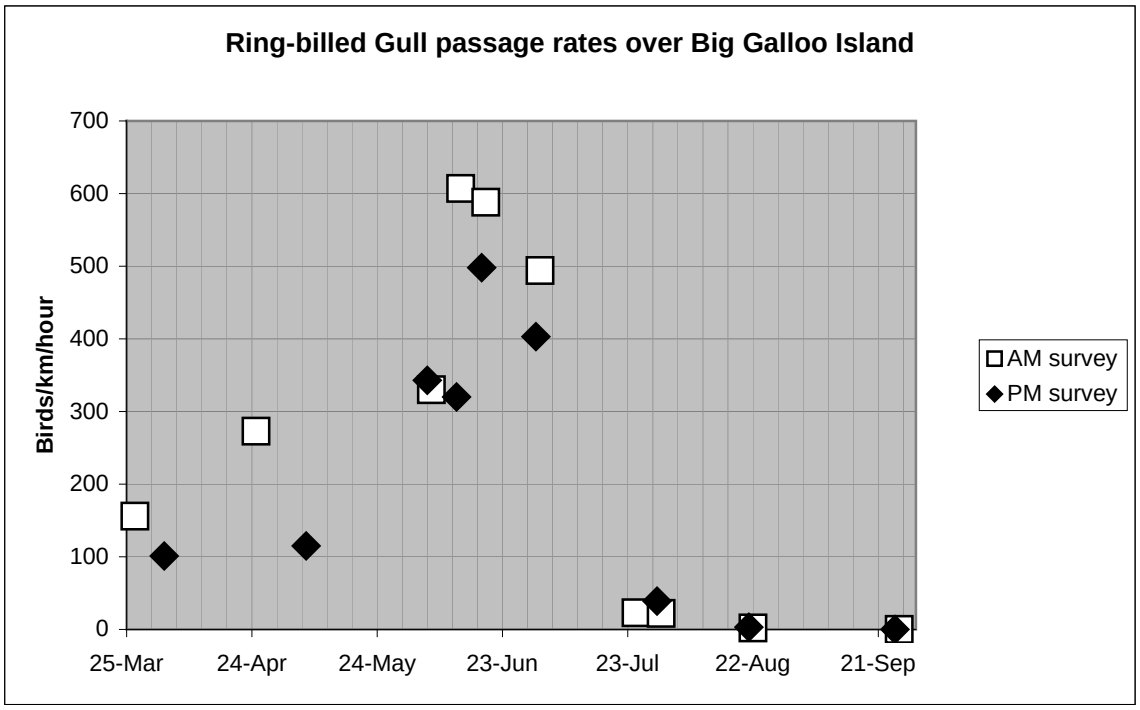

Fig. 3. Mean passage rates of Ring-billed Gulls observed flying during 19 five-point surveys (by date and time of day).

Throughout the survey period, Ring-billed Gull passage rate over Big Galloo was fairly evenly dispersed across the island, but survey points 4 and 5 had a 15-25% higher passage rate than points 1-3 from late March through July (Fig. 4). The passage rate at points 4 and 5 was higher because of Ring-billed Gull transit to and from plowing and haying operations at the north end of the island. The primary direction of flight at each survey point was either away from or toward Little Galloo Island. The initial flight direction in the morning was that of birds flying away from Little Galloo and the early evening flight was birds flying toward Little Galloo. Mid-day flights were more equally distributed between birds flying toward and away from Little Galloo.

Flight direction and passage rates of Ring-billed Gulls were sometimes clearly caused by the location of the daily food source. The plowing and haying activity in the

north fields on the island was a major factor in the flight patterns for thousands of gulls. A hatch of flying ants in mid-July focused the feeding activity of Ring-billed Gulls over the center of Big Galloo on July 17th -- thousands of Ring-billeds were involved with circular flight patterns over the center of the island at altitudes less than 50 m above ground level. On another occasion in April, thousands of Ring-billed Gulls were present in the water along the northeast side of Big Galloo feeding on a small midge. The midge had hatched on Big Galloo and had been wind drifted into the water.

While the Ring-billed Gull passage rates documented over Big Galloo were fairly high, an even higher density vector of flight was noted coursing between Little Galloo and points north of Little Galloo daily from May through mid-July. This flight vector occurred over water. Flight vectors of gulls in easterly directions from Little Galloo were not studied in this survey.

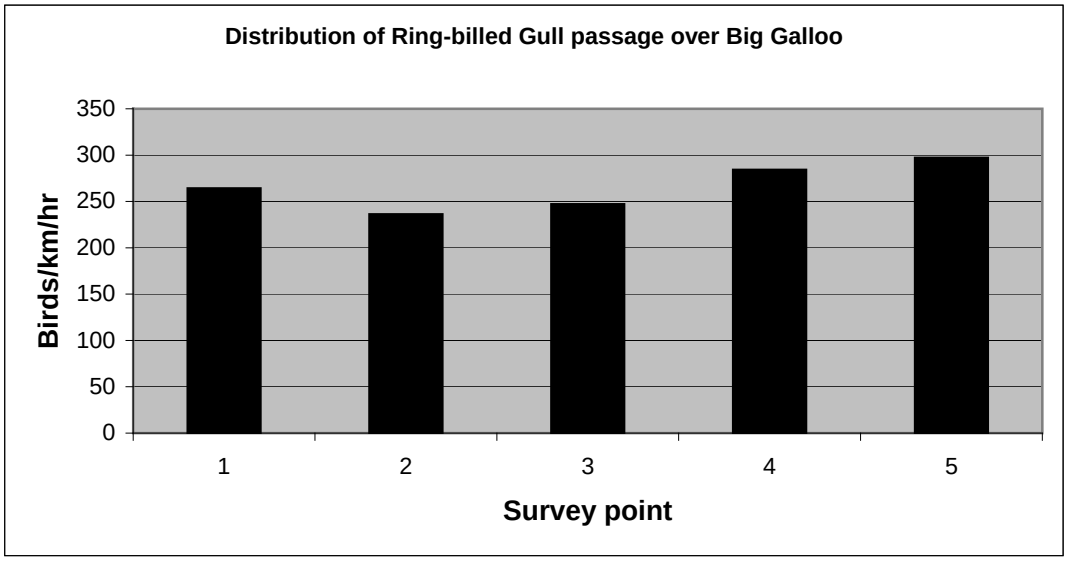

Fig. 4. Mean Ring-billed Gull passage rates documented at five survey points on Big Galloo Island from late March through July (n=15).

The flight altitude of Ring-billed Gulls documented from the five-point surveys varied with weather conditions. Gulls tended to fly lower into head winds and higher with tail winds. The overall height distribution of typical daily flights of Ring-billed Gulls during the surveys was 63% below the rotor-swept zone (< 35 m agl), 5% above the rotor-swept zone (>125 m agl), and 31% within the rotor-swept zone (35-125 m agl). Ring-billed Gull flight altitudes did not vary noticeably between survey points, with the exception that kettling groups of Ring-billeds (100+ m agl) were documented more frequently over the central portion of the island (points 2-4). Most of the observations flying over Big Galloo during the day were of individuals or small groups (2-6). The initial pre-sunrise passage of Ring-billeds over Big Galloo in the morning occurred in continuous loose waves containing 20 or more birds. This flight had peak passage rates of over 1000 gulls/km/hr for a half hour or so at point 4 in June. Most morning surveys began after this peak dispersal wave had passed over in order for light conditions to improve enough for Caspian Terns to be distinguished from gulls.

Double-crested Cormorant

Fig. 5 shows mean Double-crested Cormorant rates of passage across Big Galloo documented during the five-point surveys. Cormorants were first noted flying over Big Galloo on the March 27 survey. Five-point surveys from mid-April to early June documented mean passage rates of less <17 birds/km/hr). During June and early July mean passage rates peaked on several five-point surveys at over 50 birds/km/hr (high of 82). By mid-July, passage rates had dropped and rates of up to 11 birds/km/hour were documented through late September.

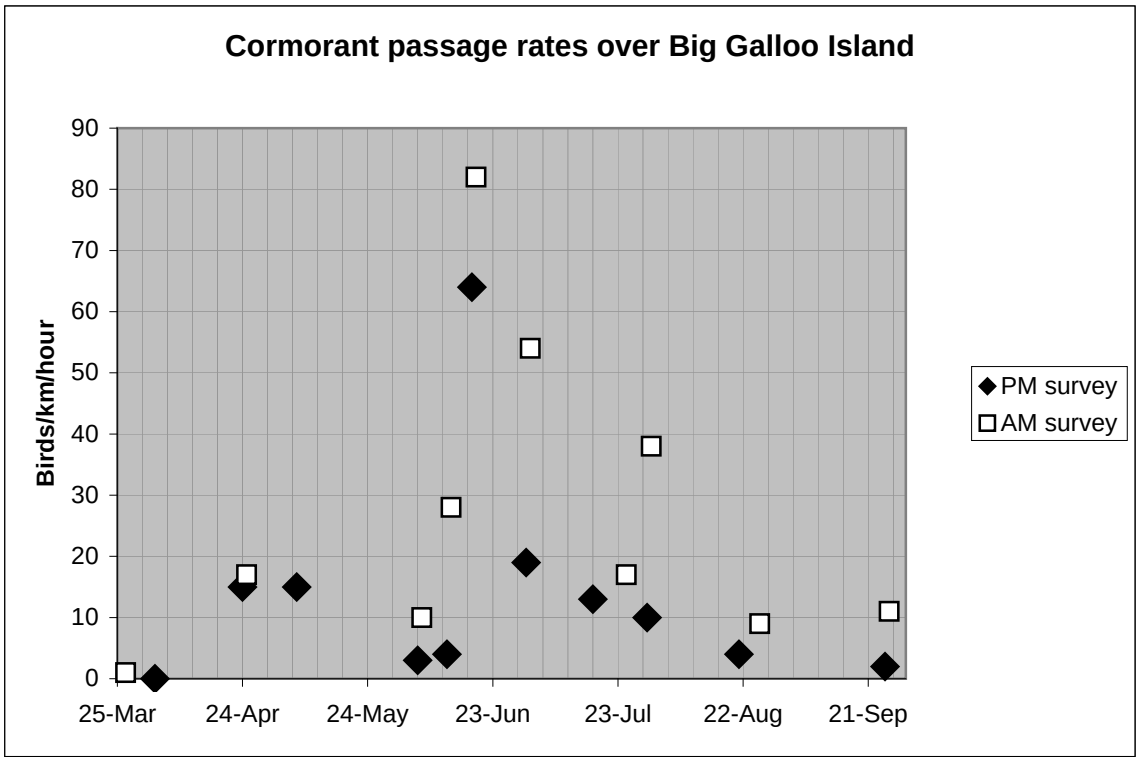

Fig. 5. Mean passage rates of cormorants observed flying during 21 five-point surveys (by date and time of day).

Fig. 6 shows that mean passage rates of cormorants were higher across the southern and northern ends of the island. Flight direction of cormorants over Big Galloo was almost always on vectors to and from Little Galloo. From April through mid-August, 95% of the flight activity was below 35 m agl, 2% was within the rotor-swept zone (35-125 m agl), and 3% was above turbine height (> 125 m). These latter birds occurred in late March and may have been early migrants to the region. Most observations of cormorants flying over Big Galloo were individual birds. Pairs were also regularly noted, and large flocks (40+ birds) were seen on several occasions flying over Big Galloo toward Little Galloo in late afternoon or early evening. The randomness of when such flocks were detected gave cormorant daily passage rates more variability than that of Ring-billed Gulls.

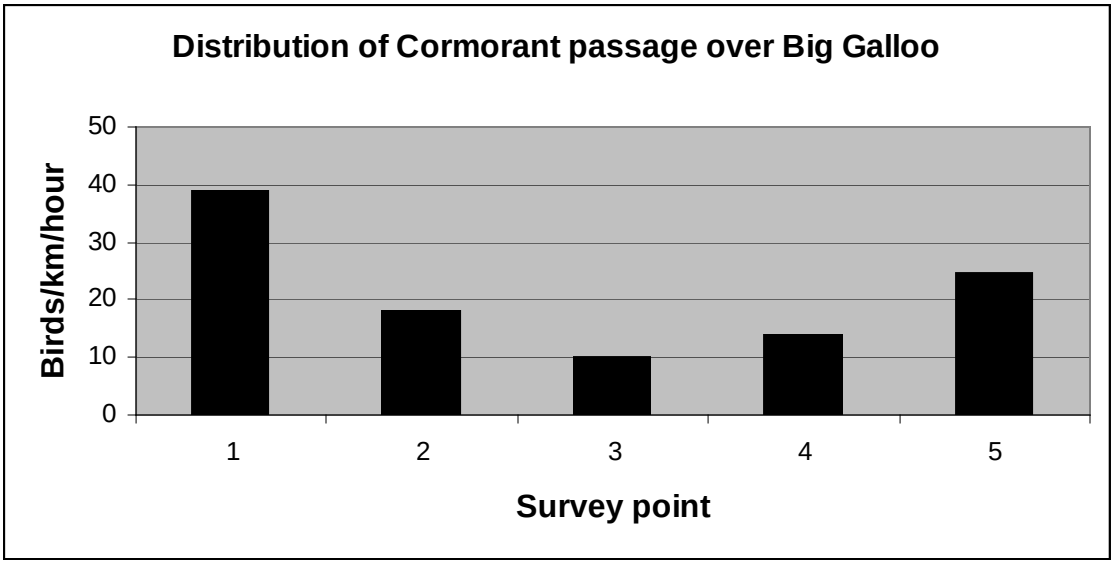

Fig. 6. Mean cormorant passage rates documented at five survey points on Big Galloo Island from late March through September (n=21).

Caspian Tern

Fig. 7 shows mean rates of passage of Caspian Terns documented during the five-point surveys. The first Caspian was seen flying over Big Galloo on April 24 and rates of passage peaked from June through July between 10-36 birds/km/hr. Very little flight activity of Caspian Terns was seen over Big Galloo in August and September. One bird observed flying over Big Galloo toward Little Galloo with a fish in late August was presumed to be returning to a nest – perhaps a renesting after a failed first attempt.

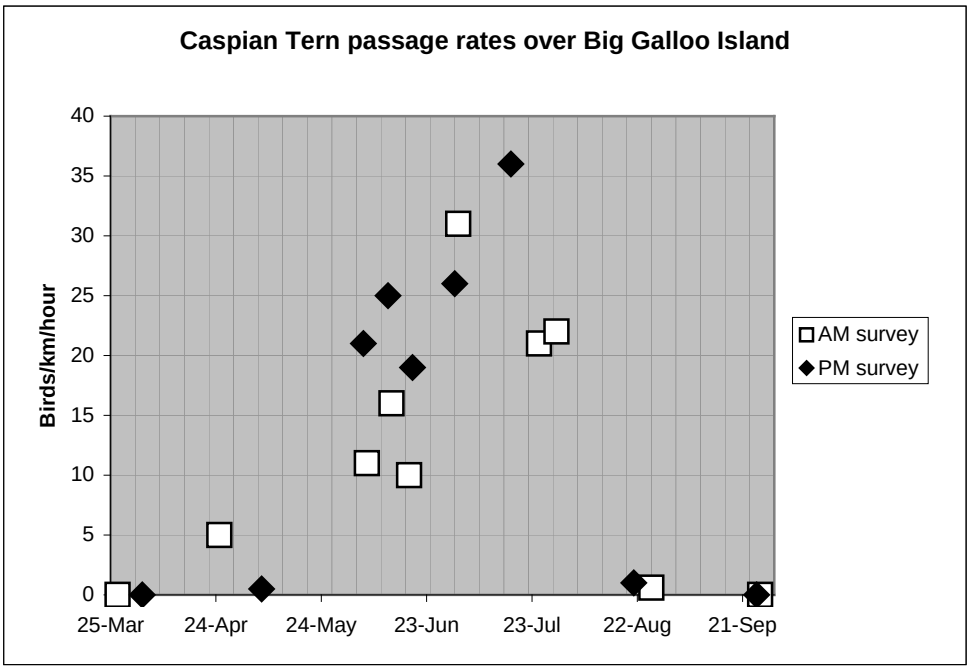

Fig. 7. Mean passage rates of Caspian Tern observed flying during 20 five-point surveys (by date and time of day).

Fig. 8 shows that the mean passage rates of Caspian Terns were notably lower over the regions surveyed at points 3 and 4 (north-central portion of island). Flight direction was in most cases on vectors to and from Little Galloo. From April through mid-August, 65% of the flight activity was below 35 m agl, 30% was within the rotor-swept zone (35-125 m agl), and 5% was above turbine height (> 125 m). These latter birds were not in transit to and from either side of Big Galloo, they were pairs of birds involved with what appeared to be courtship chase flights. One bird would chase another and circle up to altitudes of up to ~200 m over the east side of Big Galloo while calling. This behavior was observed on multiple occasions in May.

Like gulls and cormorants, the early morning flights of Caspian Terns were predominantly birds flying away from Galloo while the early evening flights were predominantly birds flying toward Little Galloo. Most observations were of individuals or pairs of birds. The maximum group size observed in transit over Big Galloo was 6. Also like gulls and cormorants, Caspian Tern flight over Big Galloo occurred all day long, with birds going back and forth over Big Galloo to and from Little Galloo. Individuals flying toward Little Galloo were often seen carrying small fish.

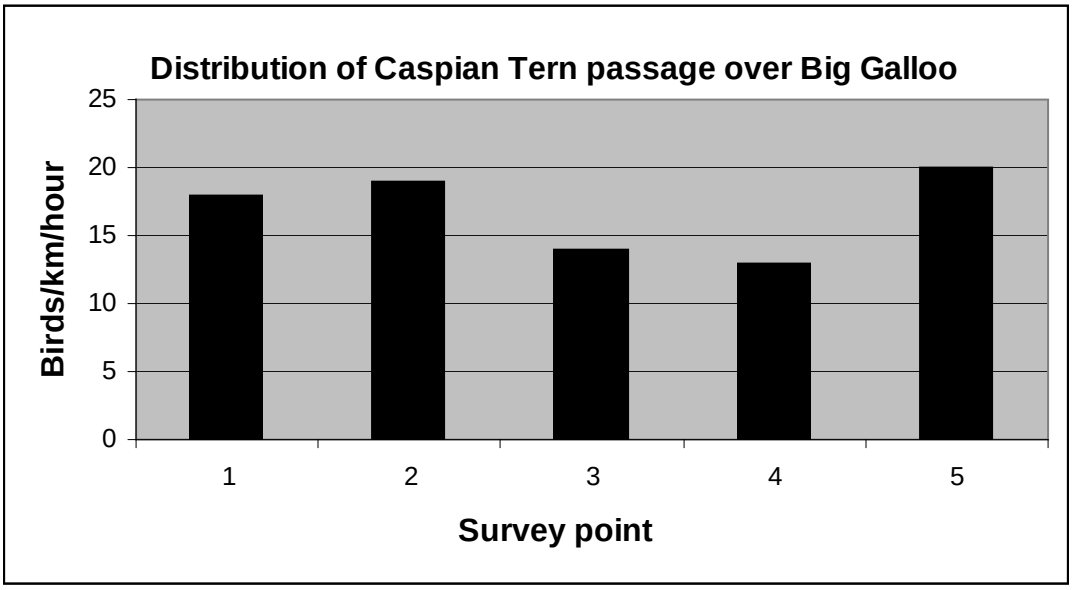

Fig. 8. Mean Caspian Tern passage rates documented at five survey points on Big Galloo Island from late April through mid-August (n=14).

Small passerine movements

On the survey mornings of May 12, 16, 23, and 29, winds had been favorable for nocturnal bird migration the previous evening and active morning flight of night migrant species was observed on Big Galloo. On all four mornings small passerines were seen flying at 10-30 m agl from southwest to northeast over the island. The flights were not noted at first light but appeared to begin about an hour after sunrise. The flights continued all morning long. The largest was on the morning of May 29 when about 100 northbound small passerines per hour were noted from one observation point for several hours in mid-morning. On all four mornings, when birds reached the northeastern end of the island some continued northward out over the water, some perched in the north-most

grove of trees, and others circled about and flew back down the island to the southwest. Most of the observations were of individuals or small groups (<5). Species noted were various wood-warblers, Baltimore Oriole, Rose-breasted Grosbeak, and Bobolink.

On the morning of May 29, a higher flight of passerines was also occurring over the island through mid-morning. Flight calls indicated that many of the birds were wood warblers and they could be seen with binoculars heading northeasterly. Their flight height was estimated to be at least 250 m agl.

Substantial morning flight of nocturnal migrants was observed on two occasions during the fall migration period. The largest was on the morning of October 6th. Hundreds of Yellow-rumped Warblers were seen in low flight (<30 m agl) heading northward up the island. The portion of this flight that reached the northern end of the island either perched or turned and headed back down the island in a southwesterly direction.

Flights of diurnal landbird migrants were seen on Big Galloo primarily in the fall migration period. The species commonly seen were blackbirds (primarily Red-winded and Common Grackle), Cedar Waxwing, Blue Jays, and American Goldfinches. Flocks of these species were observed flying around the perimeter of the island (within 200 m of the shoreline). Flight altitudes were typically less than 30 m agl. While American Robins were not observed in diurnal migration, thousands were observed feeding on the north-central portion of the island on November 2. It is likely these individuals also were involved with diurnal migration flights around the island when they first arrived and also during the crepuscular periods of the day. Other diurnal migrant landbirds noted in flight around the island were American Pipit, Horned Lark, Pine Siskin, and White-winged Crossbill.

Waterfowl

Flight activity of waterfowl over Big Galloo was noted in the winter bird and breeding bird studies for the island (Old Bird, Inc. 2008a, 2008b). The winter bird study noted very little flight activity over Big Galloo considering the large numbers of waterfowl residing in the waters around the island. The breeding bird study noted regular flight activity over Big Galloo of female Common Mergansers and Canada Geese (all at flight levels < 30 m agl). In the period between the winter bird study and the breeding bird study (late March through mid-May) the most notable waterfowl activity was documented on the morning of March 27 when thousands of Canada and Snow Geese were seen in migration over the region. This flight was evident in the small plane flight to Big Galloo from the Watertown Airport at ~8AM. Based on the planes altimeter, most flocks were flying 300 m or higher above ground level. The waterfowl flight was heading northbound and appeared to be more heavily concentrated along the coast but extended at least out to Big Galloo. The NEXRAD images in Fig. 9 suggest that the flight over Galloo originated at first light from the southeastern shoreline of Lake Ontario.

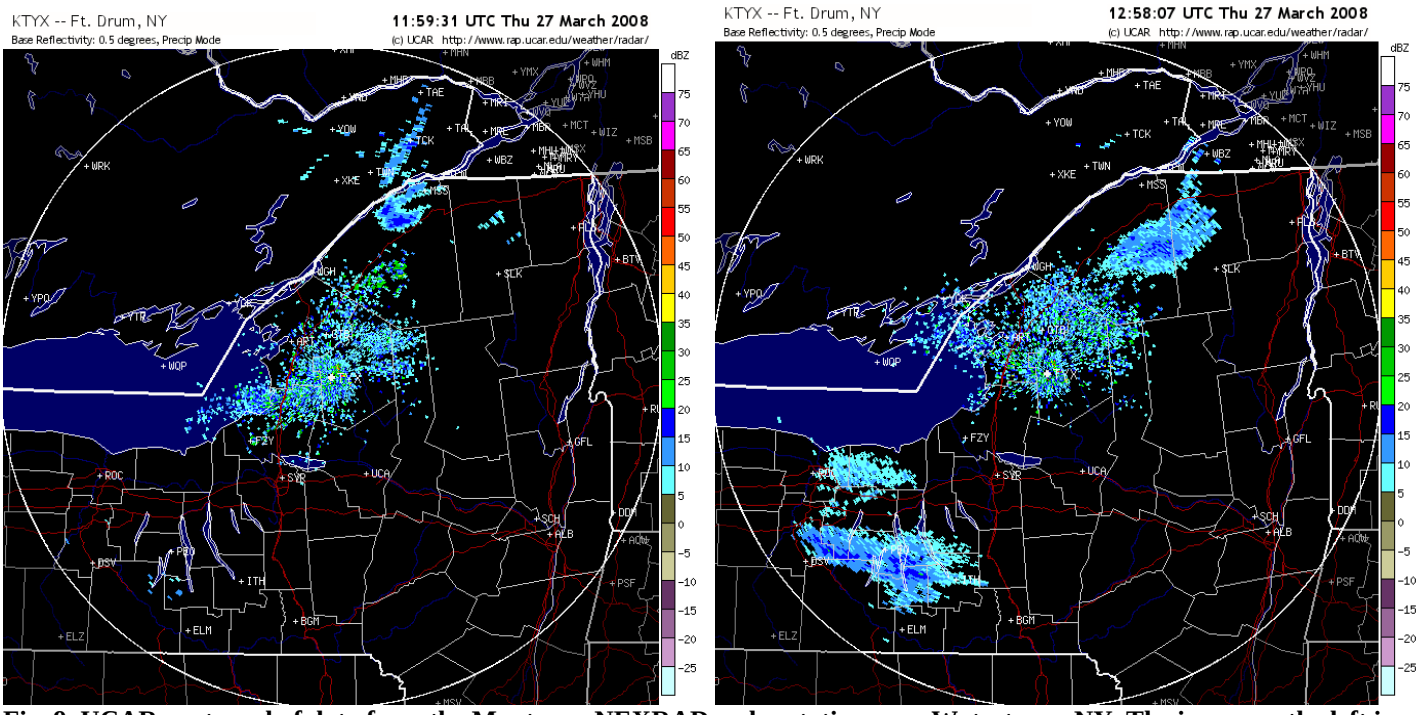

Fig. 9. UCAR portrayal of data from the Montague NEXRAD radar station near Watertown, NY. The image on the left is from 8AM EST and shows target reflectivity over the southeastern portion of Lake Ontario. The image on the right is from 9AM EST and shows the wave of targets moved at least 40 miles to the northeast portion of Lake Ontario. No precipitation was occurring over the lake region.

Observations were made on Big Galloo at the five survey points on March 27th from 9:00-11:40AM. Five flocks of Canada Geese were seen in northbound migratory flight, all over 300 m agl. Three of these flocks appeared to originate from the southwest and were heading northeasterly. Two were on a south-to-north vector. Also noted on the March 27 survey were regular low-altitude flights of small groups of Canada Geese and ducks. The ducks species noted were Wood Duck, Black Duck, and Mallards. Flock sizes were less than 30 and altitude ranged from 30-70 m agl flying in all directions. These appeared to be migrant birds that were staging in the area and flying from one side of the island to the other. Seven such flocks were seen in the 2.5 hour survey period.

The survey on Big Galloo in the morning of April 3 also noted similar waterfowl dynamics as March 27. Greater densities were also noted near the primary Lake Ontario shoreline during the plane flight from Watertown airport. Nine flocks of Canadas and Snows were between 9:20-11:30AM in high flight over Big Galloo. Only two low-flying flocks of ducks (one was a flock of 8 Wood Ducks) and two low-flying pairs of Canadas were seen in the full 2.5-hour survey. As the peak waterfowl migration period passed, waterfowl flight over Big Galloo remained sparse, with regular flights (generally <50 m agl) of the half-dozen or so nesting Canadas, along with occasional low-altitude flights of local nesting ducks (Common Mergansers, Gadwall). Passage rates of ducks documented during five-point surveys in April and May were never greater than 1 individual or one small flock per kilometer per hour.

Five-point surveys and general observations in summer and fall did not note any increase in duck flight activity from that observed in spring. The local Canada goose breeders flocked up and a group of up to 30 Canadas was occasionally seen flying to grassland areas on the island to feed. Duck flight activity over Big Galloo remained very

low. Mallards and Black Ducks number began to increase in October and had reached at least several hundred by mid-November, 2008. But as observed in the winter bird study, few of these ducks had a habit of regularly flying over Big Galloo.

Raptors

No raptors were observed actively migrating during the spring surveys. The only raptors seen actively migrating in fall were three Northern Harriers on October 6. These birds flew in from the north (over water) at ~300 m agl. They were observed in flight over the midsection of the island but no information was attained on whether they continued migrating or stopped to forage on the island. Small numbers of Rough-legged, Red-tailed (max of 2/day), Sharp-shinned (max of 2/day), and Cooper's Hawks (max of 2/day), American Kestrels (max of 6/day), Northern Harriers (max of 4/day), Bald Eagles (max of 2/day), and up to a dozen Turkey Vultures were seen in April and May. All but Rough-legged and Sharp-shinned were seen in June and July, again in similarly small numbers. All were seen from August through October including Peregrine Falcon (daily max of 1) and Merlin (daily max of 1).

Some of these raptors (especially Red-taileds and Kestrels) were local breeders. Others were migrants staging on the island. Most were seen perched or in low flights (<30 m agl). The eagles, buteos, accipiters, and Turkey Vultures were regularly seen soaring to altitudes of over 200 m agl.

Shorebirds

Shorebirds were not seen in active migration during any surveys, but many species of migrant (nonbreeding) shorebirds were found feeding on Big Galloo. Several of these species were seen flying over the interior of the island. The only species that was seen flying within the rotor-swept zone (35-125 m agl) was Greater Yellowlegs – individuals and small flocks were seen flying in the rotor-swept zone along the perimeter of the island on 6 occasions. Twelve other species of nonbreeding migrant shorebirds were seen flying near ground level along the shoreline or feeding within the plowed fields at the north end of the island (see list below). The sandy beach at the southeastern end of the island was a frequent congregation spot.

Black-bellied Plover *Pluvialis squatarola*
Semipalmated Plover *Charadrius semipalmatus*
Greater Yellowlegs *Tringa melanoleuca*
Lesser Yellowlegs *Tringa flavipes*
Whimbrel *Numenius phaeopus*
Ruddy Turnstone *Arenaria interpres*
Red Knot *Calidris canutus*
Sanderling *Calidris alba*
Dunlin *Calidris alpina*
Pectoral Sandpiper *Calidris melanotus*
Semipalmated Sandpiper *Calidris pusilla*
Least Sandpiper *Calidris minutilla*
Short-billed Dowitcher *Limnodromus griseus*

Other species

Great Blue Heron, Common Raven, and American Crow were seen in small numbers (typically less than 2 per survey day) throughout this study. Flight altitudes observed were less than 30 m agl, except on one occasion when two Ravens were seen soaring over 200 m agl over the center of the island.

Discussion

Daily survey coverage exceeded that prescribed in the bird and bat workplan for the Hounsfield Wind Energy Project (Old Bird, Inc. 2007). Surveys were carried out on 43 instead of 32 days from mid-March through mid-November. Surveys were carried out at least once a week from April 24 – October 16, and approximately biweekly prior to and after this period due to several surveys being missed because weather limited travel to Big Galloo.

There were several modifications to the study from that proposed in the aforementioned workplan. The planned four 30-minute observations per day of waterbird transit between the north pond/marsh and the north bay were not carried out because no transit of birds between these sites was ever observed from point 5 in the five-point survey or in during other surveys at the north end of the island. Also, less effort was made in documenting flight activity of Little Galloo nesters over Big Galloo during the full course of the day. Instead, most surveys were carried out at roughly the same times of day (morning or early evening) so that changes in passage rates could be more consistently documented through the season.

Conclusion

This report provides baseline data on the passage rates and flight characteristics of Little Galloo colonial waterbirds over Big Galloo Island. Additional flight characteristics and behavior are also noted for shorebirds, waterfowl, raptors, migrant landbirds, and other species observed in flight over Big Galloo during the surveys. This information may help assess potential avian collision risk with the proposed Hounsfield Wind Energy Project.

Literature cited

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