Results of Abbreviated Passive Acoustic Monitoring of Nocturnal Bird Migration Conducted Near the University of Maine Deepwater Test Site at Monhegan Island During Fall Migration, 2011

a final report prepared for and submitted to the University of Maine and DeepCwind Consortium
June, 2012

by
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Suggested citation for this report: Holberton, R.L. and Wright, W.A. 2012. *Results of Abbreviated Passive Acoustic Monitoring of Nocturnal Bird Migration Conducted Near the University of Maine Deepwater Test Site at Monhegan Island During Fall Migration, 2011; a report submitted to the University of Maine and DeepCwind Consortium.*

Cover photos: Acoustic recording set-up at Lobster Cove (photo courtesy of David Bridges); spectrogram of White-throated Sparrow migratory flight call; White-throated Sparrow (R. Holberton photos).

Executive Summary – The University of Maine's Laboratory of Avian Biology (hereafter LAB) was contracted to conduct passive acoustic surveys on Monhegan Island, approximately 22 km southwest from Port Clyde on the mainland, at a land-based location nearest to the University of Maine's deepwater offshore wind test site located in state waters within 5 km of the southwest coastline of the island. The main objective of the acoustic survey project was to record flight vocalizations made primarily by nocturnal landbird migrants occurring within the detection area during the period of the calendar year corresponding to the same period in a subsequent year in which a single 1.5 kW test turbine is planned for deployment, sometime from late July through early November 2012 or 2013. The equipment was in place within a week that funds became available. Recording began on the night of 30 September-1 October and continued through the night of 4-5 November, operating 15 hours each night from 1800h to 0900h EDT the following morning to target nocturnal migrants, including those who may be arriving at the site soon after dawn. Only calls characteristic of migratory flight calls, in contrast to alarm calls or songs, were included in analyses and were limited to those in the high frequency range.

The monitoring period was late in the migration season for mid-coast Maine. The acoustic monitoring period for landbird migrants at the site on Monhegan Island captured the late passage of only a few warbler species and the majority of sparrows. By the end of the monitoring period, MFCs comprised mostly sparrows, a pattern consistent with other acoustic surveys, banding, and visual observations for the region. Within-night patterns during the monitoring period revealed that the site is a multi-purpose one at which not only do migrants fly over while aloft, but also depart from soon after sunset, patterns that are congruent with radar collected at this site the previous fall. This area on the island, nearest to the offshore test site, is likely to concentrate migrants not only because it may offer optimal habitat characteristics for foraging and refuge for some species on stopover, but it appears to serve as a strategic departure area for landbird migrants ultimately heading to the mainland. The reverse may be true for migrants in spring. Further, flight altitudes are not only lower as birds ascend or descend, but also during flights over water, along coastlines, and in conditions with poor visibility. While the currently proposed 1/3 scale test turbine is likely to incur little direct collision risk to most landbird migrants under optimal weather conditions, lighting during construction, operation, and removal phases of the proposed small-scale test turbine should be minimized, particularly during periods of high migration activity and under low visibility conditions.

INTRODUCTION

As reviewed by Evans (2005), it has been known for centuries that birds make vocalizations during migratory flights, although the purpose of these calls is still debated. The first electronic recording of night migrants in North America began in the early 1900s and illustrated the wide diversity of sounds birds make when flying aloft (Graber & Cochran 1959, 1960; Evans 2005). These vocalizations, known as 'migratory flight calls', differ from those made in other contexts such as courtship, social interactions, and predator detection primarily by the shifted frequency range, generally short duration, and reduced complexity compared to song or alarm vocalizations.

Technological advances over the past 50 years have improved the quality of flight call recordings and the ability to analyze them, resulting in a growing database of flight call identification. While many flight calls of distinct sound frequency, pattern, and duration can be made by more than one species, most calls have been found to be species-specific. Researchers at Cornell University and elsewhere continue to improve night sampling techniques and flight call identification (Farnsworth et al. 2004; Farnsworth 2005; Farnsworth & Lovette 2005; Lanzone et al. 2009). The ability to document, through the use of 'passive acoustic survey', the temporal and spatial movement patterns of known species or species groups provides much needed information about migration at local as well as broader landscape levels (Evans & Mellinger 1999; Murray 2004; Farnsworth et al. 2004; Farnsworth 2005).

STUDY OBJECTIVES AND DESIGN

Objectives -

The main objective of this preliminary study was to document and characterize nocturnal migrant passage, as detected by vocalizations, during the fall 2011 migration period at a location nearest to the offshore deepwater wind energy test site located approximately 5 km away. Migratory flight calls, hereafter referred to as MFCs, are defined as those made only in the context of migratory flights, with birds aloft at the moment of calling. Thus, one can assume that the detection of MFCs illustrates birds are present and actively in flight at the time of recording. Most migratory landbirds are nocturnal migrants that, at the end of a stopover bout to rest and refuel, resume migration within the first few hours after sunset and end a night's bout of flight before dawn. For birds crossing ecological barriers such as large bodies of water or desert, flights

may continue after sunrise in order to reach an appropriate stopover area (Baird & Nisbet 1960; Gauthreaux 1971; Able 1977). Although not confirmed by direct visual observation in this study, MFCs recorded soon after sunset are interpreted as made from birds that initiated flight at or near the recording site, and that these birds, at the end of the day, are resuming migration after having been on stopover in the local area. Similarly, a concentration of MFCs near the period of sunrise (before and after) are interpreted as made by birds passing by or arriving to land near the recording location, most likely to initiate a stopover period of rest and refueling after a night of migratory flight. MFCs detected at other times within the recording period clearly indicate birds flying over, but could also include those departing from or arriving at the general recording area. Examining temporal patterns of MFC distribution within each night as well as changes in species group composition of MFCs throughout a migration season helps characterize the site. *The extent of acoustic monitoring at this site was limited by when funds became available and for the scope of the proposed activities associated with siting, operating, and removal of a single, small test turbine, described as having a spar no more than approximately 30.5 m above waterline and a rotor diameter of approximately 21.3 m, for a total height of approximately 41.1 m above the water, and deployed only during the July – November, 2012 or 2013 window proposed at the time of the study's initiation.*

Study Design

Recording Site – Monhegan Island (43° 45′ 59″ N, 69° 19′ 5″ W) is approximately 22 km southeast from Port Clyde on the mainland (Fig. 1). Its total land area is about 2.59 km^2 and is dominated by mixed conifer and scrub vegetation ringed by a rocky shoreline. The acoustic equipment (see description below) was set up approximately 25 m above sea level at the southern end of Monhegan Island in an area called "Lobster Cove" (43°45.494' N, 69° 19.284' W) and within 100 m of the site at which, in 2010, the marine surveillance radar was operated by New Jersey Audubon for the University of Maine's DeepCwind deepwater offshore wind energy test project (Fig. 2). This site provided an unobstructed view in the direction of the offshore test project site to the south and of the mainland to the west-southwest (Figs. 1, 2). The buoy deployed by DeepCwind for gathering weather conditions and sea characteristics at the deepwater test site was not collecting data after October 7, 2011. Thus, wind direction and speed data representative of relevant conditions near the monitoring site were obtained from the buoy, LLNR

820, Station 44005 (43° 12’ 13”N; 69° 7’ 40” W), located 144.5 km east of Portsmouth, NH and operated by the National Data Buoy Center. This buoy provided general weather conditions that would be relevant to not only birds at or near the test site but also for those making trans-Gulf flights from Nova Scotia and New Brunswick.

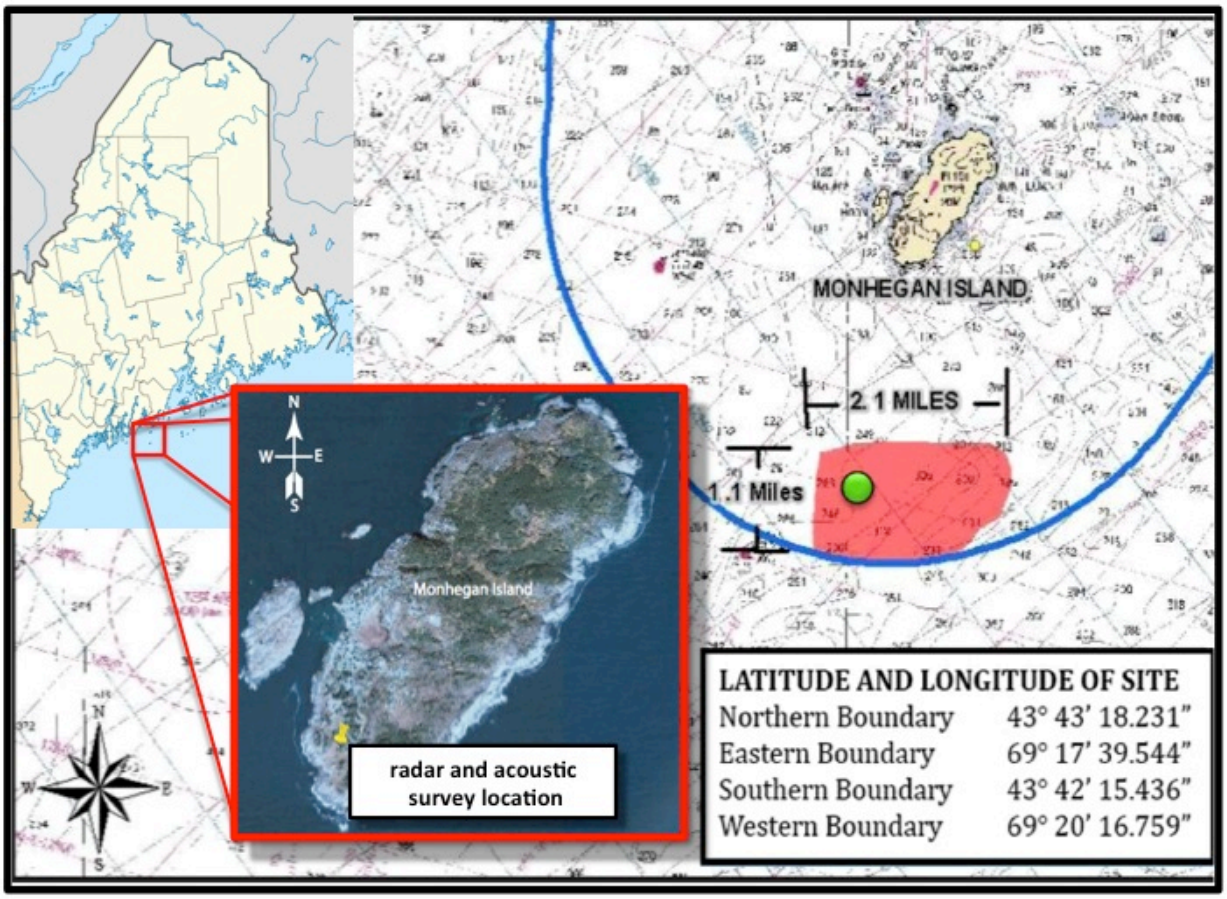


Figure 1. The location of Monhegan Island with respect to the Maine coastline (upper left image from Wikipedia) is shown in a chart illustrating the location of the University of Maine-DeepCwind Consortium’s deepwater offshore wind energy test site (shown as green dot within the state-designated test site area noted in red and denoted by the coordinates provided; the blue line indicates the boundary between state and federal waters; image from UMaine-DeepCwind Consortium). The center insert shows the location of the land-based survey site, marked with the yellow pin, at Lobster Cove on the southwest end of Monhegan Island (insert image from Mizrahi, 2010).

Recording Equipment - microphone assembly, recorder, and power supply

Microphone assembly – The microphone assembly was constructed following the general housing design developed by William Evans (Oldbird, Inc., http://oldbird.org/mike_home.htm)

(Figs. 3, 4). The otherwise omnidirectional microphone element (Wildlife Acoustics® SMX-II, reported sensitivity: -36+/- 4 dB (0dB = 1V/pa@1KHz; frequency response: flat 20Hz – 20,000Hz; signal-to-noise ratio: > 62dB, Wildlife Acoustics®, Inc., Concord, MA; www.wildlifeacoustics.com) was adapted for unidirectional recording of sounds originating from above.

Figure 2. View from the acoustic survey/marine surveillance radar survey site looking south-southwest from Lobster Cove (photo courtesy of David Bridges; insert image from Mizrahi, 2010)

The microphone element, with its wind-deterrent foam covering removed (Fig. 3A), was held in place by a heavy marine gasket positioned in the center of a solid plastic plate (approx. 20 cm diameter, Fig. 3B, C). This created a 'pressure-zone' microphone wherein the plate provides a rigid sound boundary directing sound vibrations towards the microphone element. Direct and reflected sound waves reach the microphone element at essentially the same time and, thus,

double in strength the sound pressure (W. Evans, Oldbird, Inc.). The microphone-plate assembly was covered with clear, thin plastic film stretched over the plate to keep moisture out (Fig. 3C, D). The underside of the plate was attached with silicone caulking to the upper rim of a small (~ 15 cm diam.) plastic flowerpot (Fig. 4A) that was then anchored by Velcro® inside a large (46 cm inner diameter) plastic flowerpot (Fig. 4A, B) that funnels and directs sounds generated from above towards the microphone while reducing ambient sounds at or below microphone level. The large flowerpot was lined with a layer of foam padding to reduce ambient noise generated at or below microphone level and to minimize sound distortion. The cables attaching the microphone to the recorder and the recorder to its power source were soundly secured to prevent them from making noise in the wind. The large flowerpot was covered with a thin cotton cloth to keep animals, leaves, and other debris out. Earlier trials conducted showed that neither the plastic film nor the cotton cloth interfered with the microphone element's detectability of avian vocalizations (R. Holberton, unpublished data).

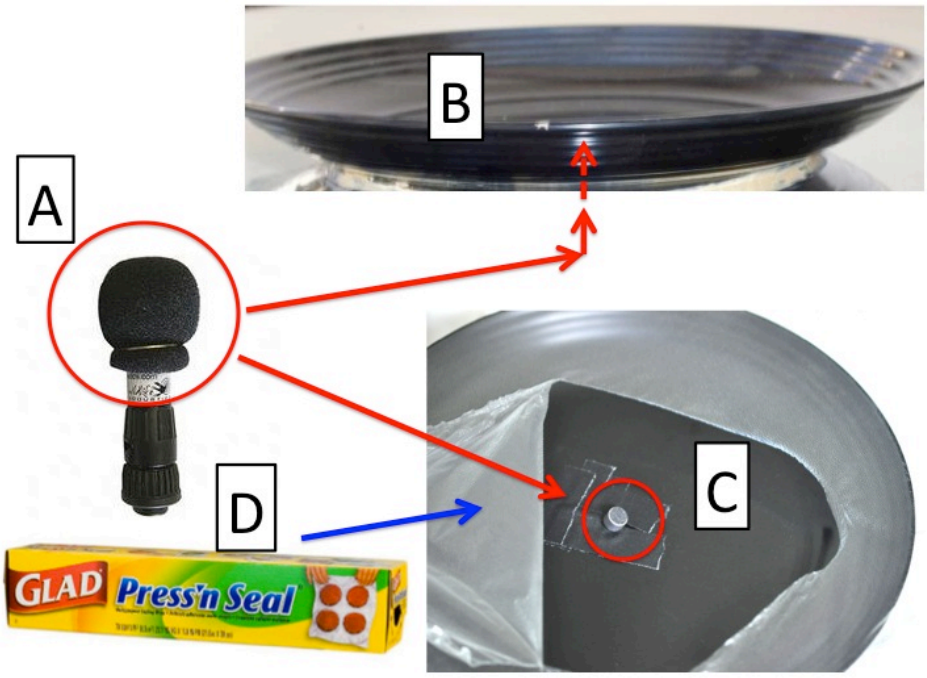


Figure 3. The Wildlife Acoustics® microphone element (A), shown here with foam wind-deterrent cover in place but removed for this study, was inserted up through a hole centered in a rigid plastic plate (B, C). Plastic film (D), shown here partially removed for display (C), protects the microphone element from precipitation.

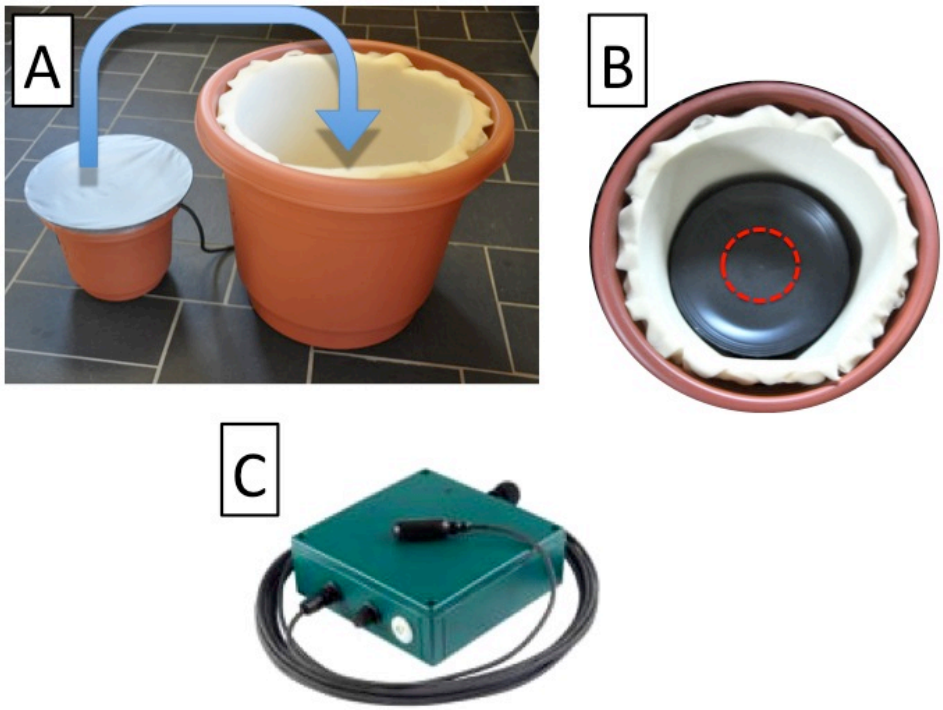


Figure 4. The small flowerpot supporting the microphone element is housed inside the large flowerpot lined with a layer of foam padding (A). The microphone, shown within red-hatched circle under the layer of plastic film (B), is centered within the large flowerpot. The recorder (C) was connected to the microphone assembly by an audio cable.

Recorder and power source – The microphone assembly, pointed skyward, and the recording unit was mounted on a 10-foot ladder anchored with rope and stakes (Fig. 5A, B). The flowerpot microphone assembly, tightly secured to the ladder frame to prevent the unit from rattling in high winds, was connected to a Wildlife Acoustics (WA)® SongMeter™, model SM2 Platform recorder (http://www.wildlifeacoustics.com/products/acoustic-monitoring, Fig. 5A, B). The unit was programed to turn on and off at pre-set times and powered by a 12-V battery charged by a solar panel (Fig. 5C). The recorder held up to four 32 GB SDHC storage discs that stored recordings as WAV format files. The sampling rate was set to 48 kHz, which, in preliminary trials, produced the clearest recordings of avian sounds and covered the frequency range of audible avian flight calls (0-24 kHz).

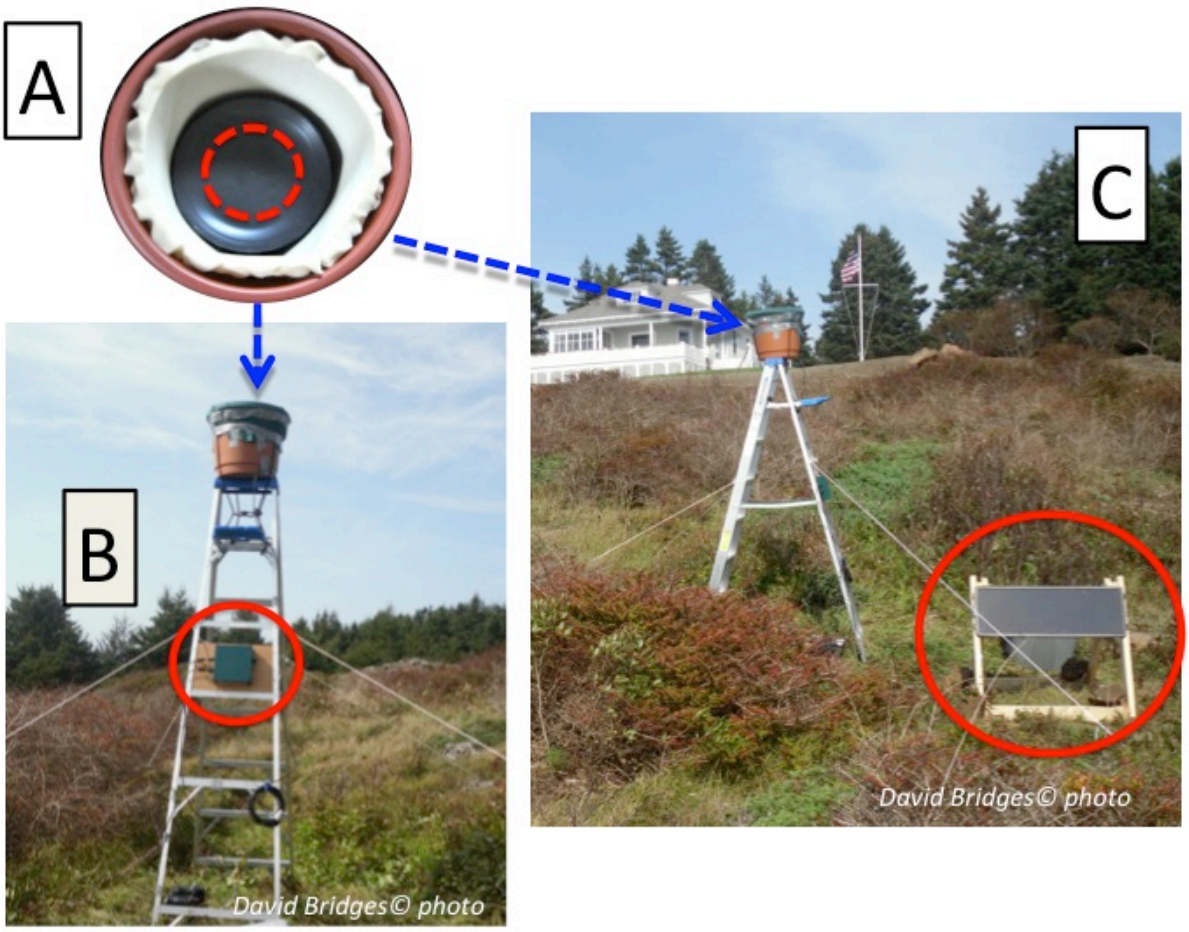


Figure 5. The microphone assembly (A, microphone element noted with red hatched circle) was covered by thin cotton cloth (green, as shown in B), directed skyward, and, along with the Wildlife Acoustics SM2® recorder (shown within the solid red circle in B), was anchored firmly to the stand. A 12-V battery (at base of ladder in B) charged by a solar panel (in solid red circle in C) supplied power.

DATA HANDLING AND ANALYSIS

Data handling – Archived hourly wind direction and wind speed obtained from the buoy (http://www.ndbc.noaa.gov/station_history.php?station=44005) in 2011 were averaged for each 3-h block of time during each night's recording period, creating a total of 75 3-h time periods for the 15 nights analyzed for temporal patterns of HF MFCs. Acoustic sound files were regularly transferred from the SDHC cards, organized into electronic folders labeled for date and time of recording, and stored on external hard drives until processed at the LAB (Fig. 6). All acoustic analyses were done using Cornell's Raven Pro 1.4® software for the Mac® platform, licensed to

the LAB at the University of Maine. The software program, which transduces digital sound into an image that visually portrays the sound's patterns of frequency, intensity, and duration, can be programed to search for desired sound ranges.

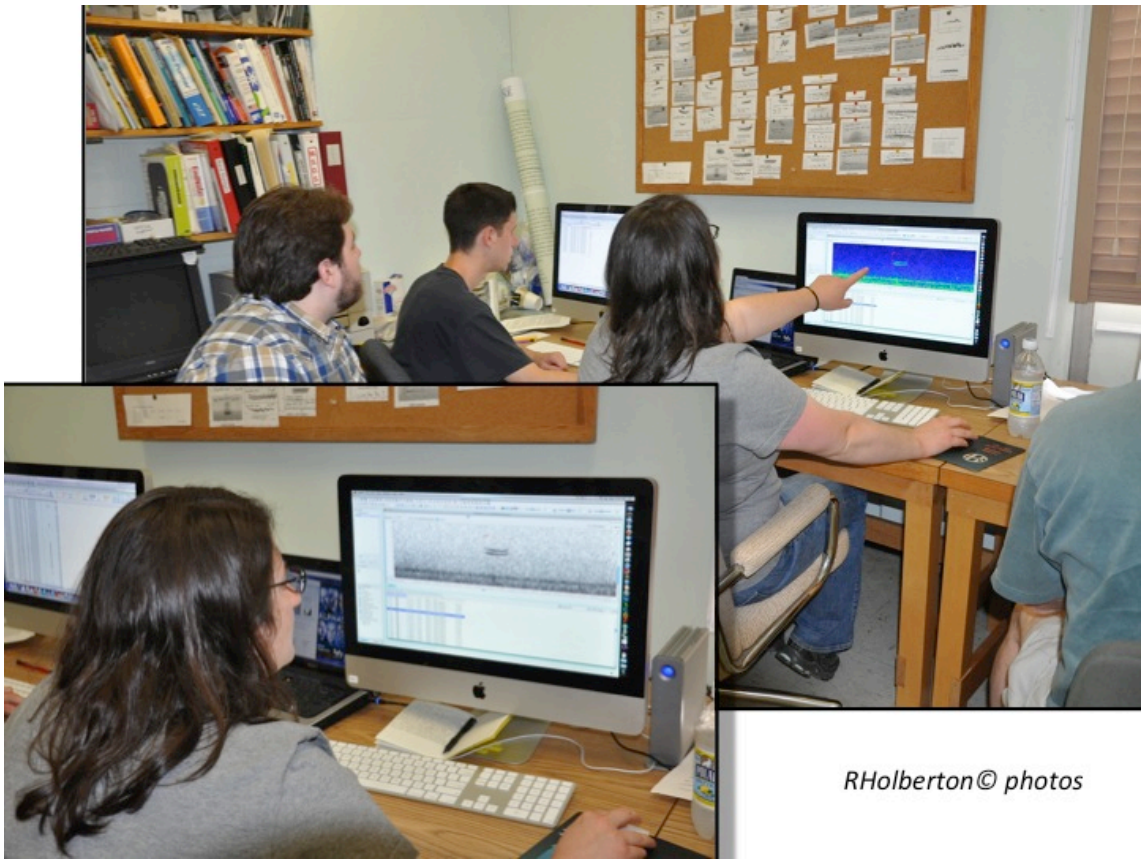


Figure 6. LAB acoustic facilities and technicians (left to right) James Skrabak, David Bridges, and Anne Marchini, supervised by Mr. Wes Wright (partially in photo at right), at work using Cornell's Raven Pro® software program to analyze avian sound files. Insert: Anne Marchini inspecting a sparrow spectrogram.

Avian MFCs normally span the range from 1 to 20 kHz, with flight calls of major bird groups clustered into two general frequency ranges: 'high frequency' (HF) comprising calls that fall mostly within 5-12 kHz (and up to 20 kHz in a few cases), and 'low frequency' (LF) comprising calls typically at or below 4 kHz (Fig. 7). In general, HF calls are short in duration (< 100 msec) and include passerines primarily comprising warblers, kinglets, finches, buntings, and sparrows (see Fig. 7A). In contrast, a few passerines, and all raptors, shorebirds, waders, waterfowl, and seabirds fall within the LF range, tending to be much longer in duration than HF calls (see Fig. 7B). Within the HF call group, different calls may overlap in frequency range

(kHz) but vary in the pattern of sounds made within this range as well as the length (msec) of the entire call (see Fig. 7, for examples). Flight calls within the 1-4 kHz range can be masked by chronic ambient noise, including wind and wind-related vegetation rustling, airplanes, and human conversation.

***Recommendation**: This report only contains information regarding avian MFCs within the HF range (~5-20 kHz) due to sound interference and masking by frequent wind that occurred during the monitoring period. To maximize sound detection and to reduce noise from wind-caused vegetation rustling, which produces low frequency sounds that obscure flight calls at or below 3-4 kHz, units should be situated at least 15-30 m from nearest vegetation (shrubs, trees) that are above 2 meters, and away from objects that make noise, especially during windy conditions (e.g. machinery, flags and lines on flag poles).*

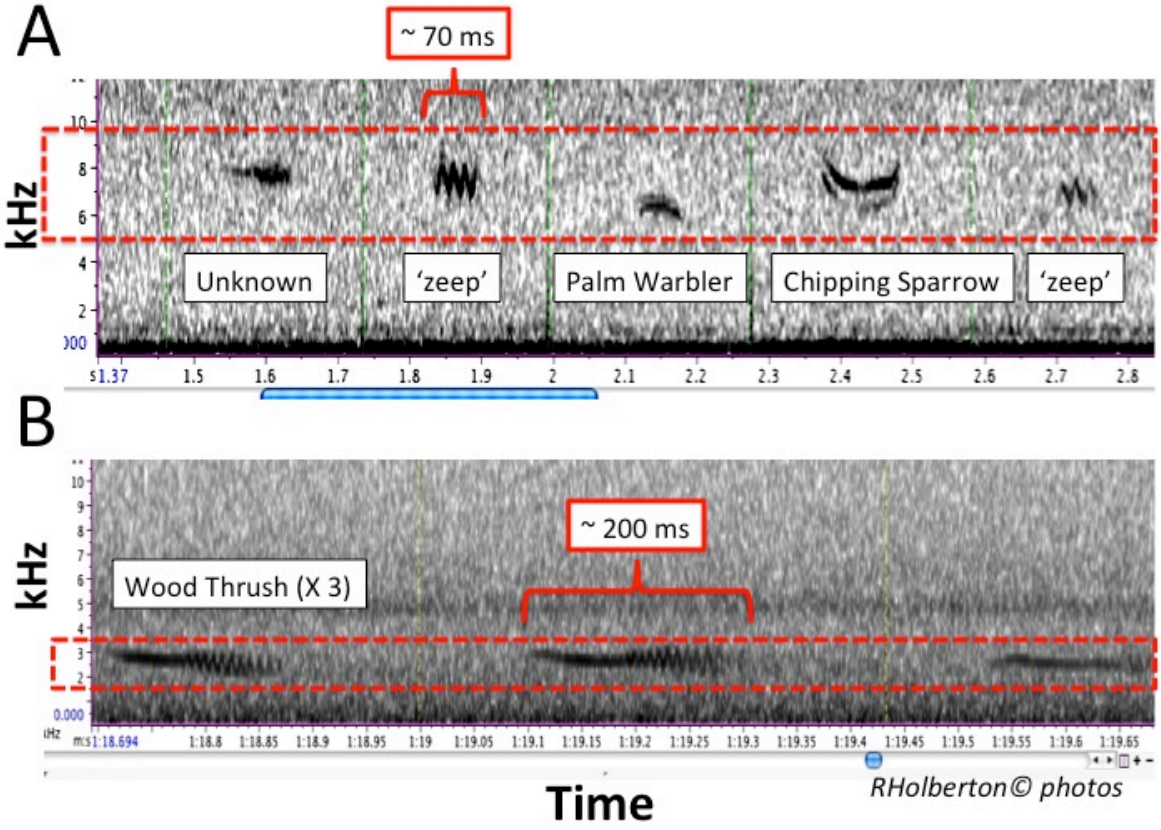


Figure 7. Spectrogram examples of high frequency (A) and low frequency (B) migratory flight calls. Note: time (x-axis) is shown in seconds for upper panel A, and in minutes and seconds for lower panel B. The top figure (A) shows five examples detected with the high frequency detector (see text for details) used to find calls characterized by a frequency range of 5 -10 kHz and < 100 ms in duration. Many calls are species-specific, such as the Palm warbler, *Setophaga palmarum*, and Chipping sparrow, *Spizella passerina* (shown), but several warbler and sparrow species make similar calls, with 3-5 modulations repeated within the same frequency range and time duration. These are collectively grouped as 'zeep' calls. Two examples of slightly different 'zeep' calls are shown in A. Flight calls of Wood Thrush, *Hylocichla mustelina*, (B) and many other species (*Catharus* thrushes, tanagers, shorebirds, etc.) are characterized by lower frequency range (1-4 kHz) and longer duration.

Four steps of acoustic data analysis:
Detector development, data extraction and filtering, call identification, and data collation

Detector development – Before any flight calls could be 'harvested' from sound files, potential MFCs were first 'detected' within each sound file by Raven® so that the potential avian sounds could be isolated from other sounds on the file and then visually examined for further identification. In the initial step, sounds of a particular frequency range and duration of interest were targeted amidst other sounds, including background noise, in the file. A set of "detector" parameters was developed for use by the software program to scan each sound file and to tag sounds that fit the targeted parameters. The best set of detector parameters were those that produced the highest "% extraction efficiency", defined as the maximum number of detections derived from a 30-min file sample from the recording site compared to the number achieved by direct visual inspection of this same sample. Once this was calculated for the Monhegan site, it was checked periodically and adjusted as needed throughout the data extraction process.

Data extraction and filtering –Once a detector searched through a sound file, Raven® was programmed to save a table containing a list of potential calls that corresponded with the composite of individual spectrograms of sounds. Each spectrogram was then visually inspected to first determine if it was a MFC or not. MFCs that could be easily identified to species or species group at this time were noted. A new table was then produced to contain only those sounds designated as MFCs. Each of these spectrograms corresponded to a sound 'snippet' that was individually 'harvested' as a single wav file.

Call identification – Sound snippets were combined to create a single composite sound file, with each snippet separated by 0.1 sec. The composite file containing the harvested but as-yet-unidentified MFCs was brought up in Raven® and each spectrogram was visually inspected. Calls were visually compared to known spectrograms by their characteristics (frequency, pattern, and duration) using a spectrogram library made available by William Evans (Oldbird, Inc., see online examples on http://oldbird.org/Library.htm and CD-ROM "Flight Calls of Migratory Birds: Eastern North American Landbirds", by W.H. Evans and M. O'Brien) and the Cornell Laboratory of Ornithology online library of flight calls, as well as the primary literature (e.g. Evans 1994; Evans & Mellinger 1999; Evans & O'Brien 2002; Murray 2004; Farnsworth et al. 2004;

Farnsworth 2005; Farnsworth & Lovette 2005). Two people independently examined all 'snippet' files to maximize identification accuracy. (It should be noted that the MFCs for many North American species have yet to be identified.)

All indistinct MFC spectrograms were categorized as 'unclear' (UNC). All distinct and intact MFC spectrograms were categorized as either 'unknown' (UNK, clear but not identifiable at this time) or into known categories of species or specific groups, or into a flight call complex. The most common HF flight call complex is 'zeep', a call that is modulated (2-4 undulations) over a fixed frequency range usually between 6-8.5 kHz and with a similar duration (for example, Fig. 6A). Several warbler species, including Magnolia warbler (*Setophaga magnolia*), Blackburnian warbler (*S. fusca*), Blackpoll warbler (*S. striata*), Cape May (*S. tigrina*) and Yellow warbler (*S. petechia*), are known to make 'zeep' flight calls.

Data collation – Once a table comprising UNC, UNK and identified MFCs was made, the list, excluding UNC, was collapsed into three upper level categories comprising "UNK' = unknowns, 'Sparrow' = sparrows of the family Emberizidae and finches of the family Fringillidae; and 'Warblers' = wood warblers of the family Parulidae and Golden-crowned kinglets (*Regulus satrapa*, family Regulidae). These three higher-level categories (UNK, 'Sparrow', and 'Warbler') were used to create nightly pie diagrams depicting the general composition of MFCs detected in the recording area. It is currently believed that Ruby-crowned kinglets, *R. calendula*, do not make MFCs. Nor do vireos (family Vireonidae), which are more closely related to shrikes (family Laniidae) than to warblers. Calls made by shrikes in the context of migratory flight have not been reported and this group may be among those believed not to vocalize in flight during migration.

Note*: Important assumptions in this survey are that all species call at same rate, that each flight call represents a single bird and that each flight call made is independent of calling activity by other birds. However, local weather conditions such as the extent of cloud cover and the height of the cloud ceiling, fog, and precipitation can affect MFC rates (Drost 1960; Graber & Cochran 1960; Evans 2005; Farnsworth 2005; Hüppop & Hilgerloh 2012).*

RESULTS

Recording Effort Summary -

As soon as funding allowed, the recording period began on the night of 30 September-1 October (local sunrise = 0633 EDT; local sunset = 1820 EDT) and continued through the night of 4-5 November (local sunrise = 0716 EDT; local sunset = 1724 EDT). Over the recording period, daylength decreased by a total of 1 h 40 min, with sunrise occurring 44 min later and sunset occurring 56 min earlier by the last night of recording. For each night, recording began at 1800 EDT, within an hour of local sunset and continued for a total of 15 hours. These times targeted the period when the majority of nocturnal landbird migrants initiate a flight, are aloft, or are likely to be arriving at stopover sites along the coast at or after dawn after making over water flights. For all periods, but especially for those around sunrise, only calls characteristic of MFCs, in contrast to songs (e.g., 'dawn chorus') or other diurnal vocalizations, were included in analyses. The total number of nights analyzed for MFCs in this report is less than the total number of nights in which recordings were made (Fig. 8) due to poor weather conditions but this is not likely to have missed many MFCs as most landbird migrants are less likely to fly in heavy precipitation or high winds.

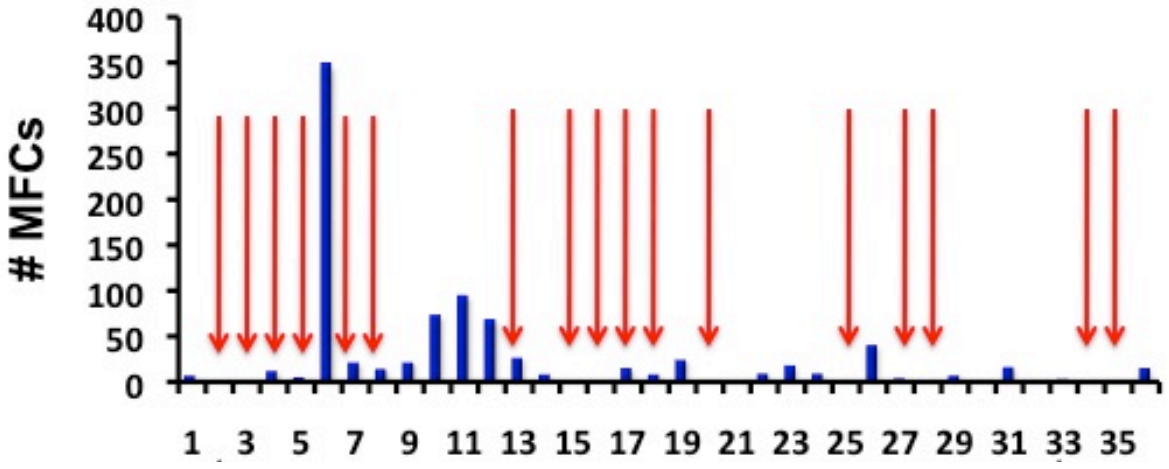


Figure 8. The total number of high frequency (HF) migratory flight calls (# MFCs) for each night (15 hours, from 1800 EDT to 0900 EDT) during the 36-day monitoring period from the night of September 30th to the night of November 4th, 2011, at Monhegan Island. Red arrows point to nights with high winds and/or rain that precluded analysis during the monitoring period.

The first few nights of recording (Sept. 30, Oct. 1, 2, and 4) yielded fewer than 10 HF MFCs not obscured by high winds (example shown in Fig. 9). Only those nights with at least ten

MFCs were analyzed for total number of flight calls (including UNKs), hourly distribution of flight calls, and species group composition.

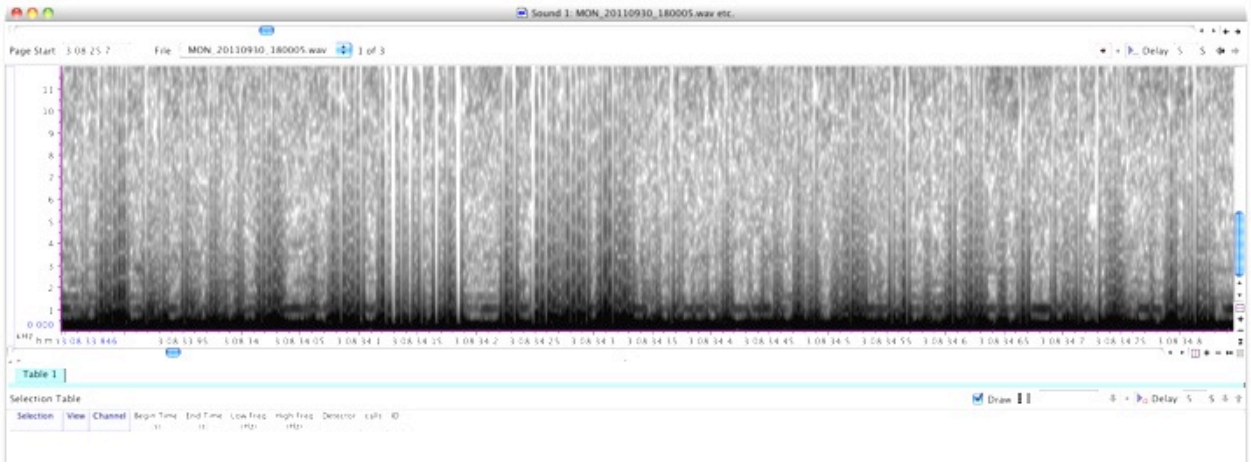


Figure 9. Example of a Raven® spectrogram produced as a result of high winds during acoustic survey recording at Monhegan Island during the night of September 30th. Note that high as well as low frequency sounds are heavily obscured by extensive wind noise.

As expected, the number of flight calls each night declined as the region's landbird migration season was coming to an end (Fig. 8, Figs. 10A,B,C). The proportion of 'warblers' declined and 'sparrows' increased (Figs. 10A,B,C). Table 1 provides a list of the HF MFCs that could be identified to species or species groups. The night of highest MFCs during the recording period occurred on Oct. 5 (Figs. 10A,B,C; shown as 'Day 6' in Fig. 8), which coincided with the onset of a period of high daily bird numbers, primarily characterized as 'late migrants', banded or visually counted at Metinic Island, approximately 18 km northeast of Monhegan (Leppold, 2011).

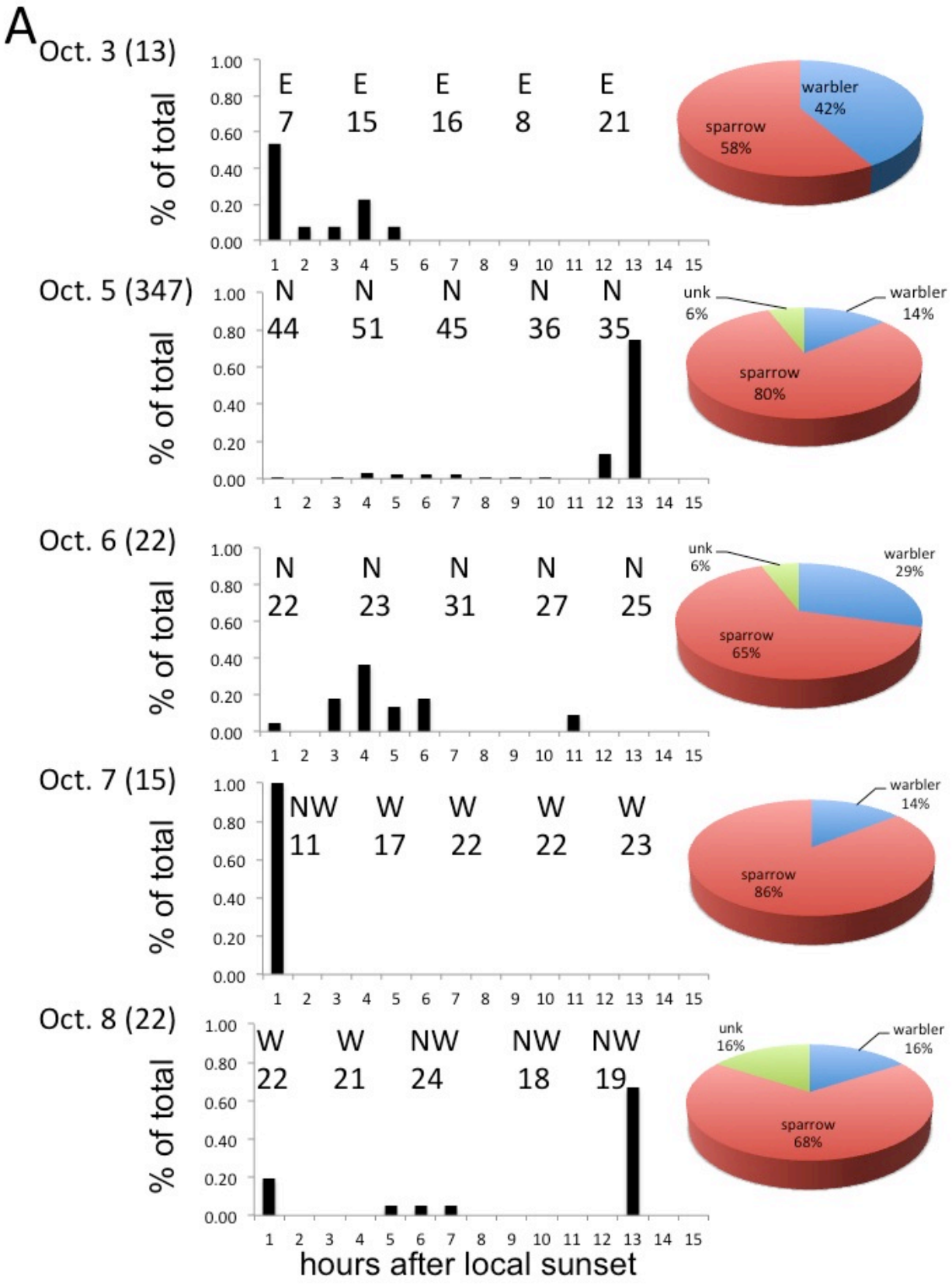
Within-night temporal patterns of MFCs, surface wind direction and surface wind speed -

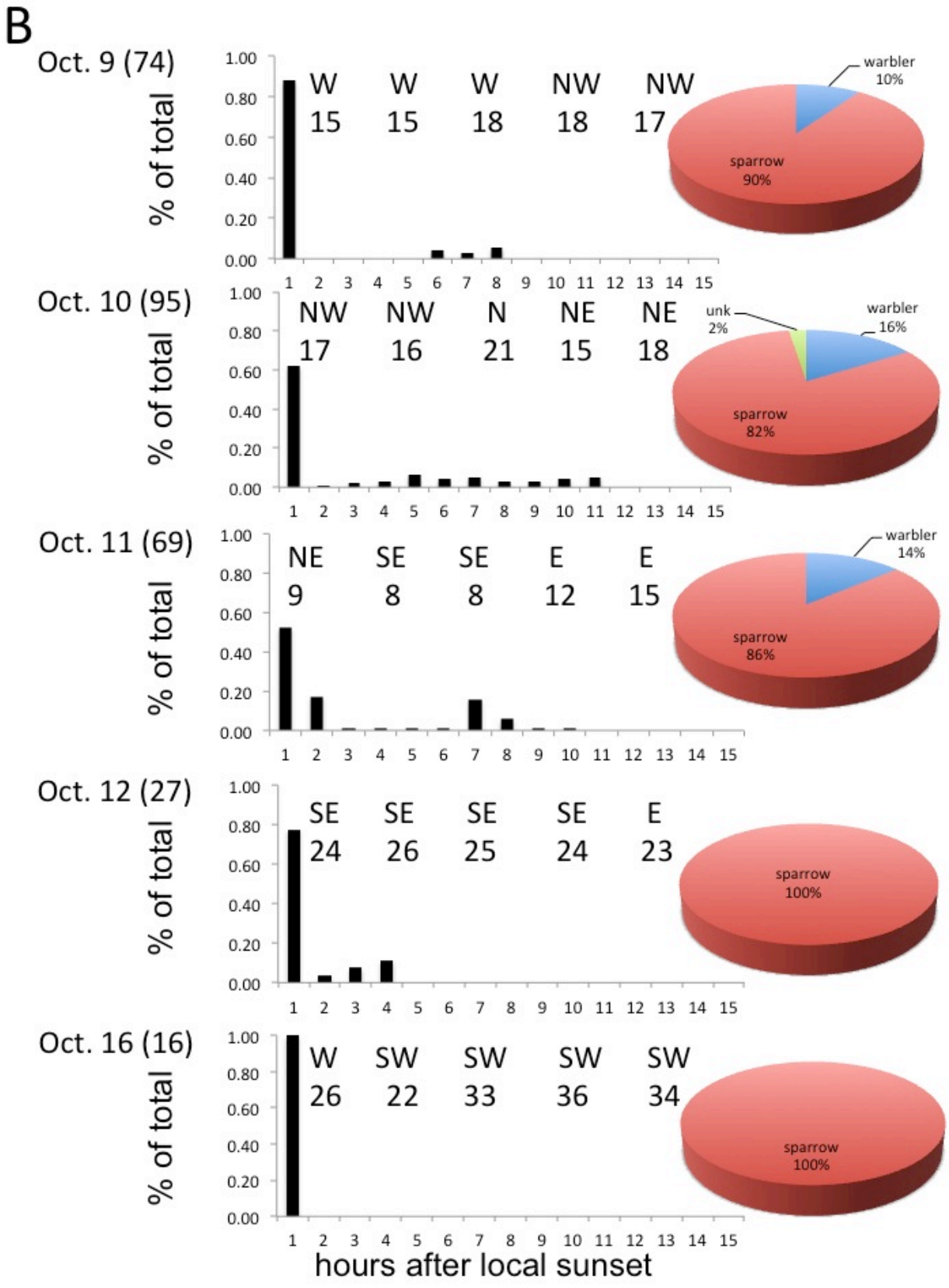
Nightly temporal patterns illustrated that not only were birds aloft over the area during the night, but that, on some nights, birds congregated and most likely departed from the stopover site soon after sunset. Further, some birds passed over and/or arrived at the site at or near dawn. As is characteristic for the northeast during late fall migration, the majority (68%) of the 75 3-h blocks of time for which acoustic monitoring occurred for the 15 nights with at least 10 HF MFCs, had surface winds out of the west (18.7%), northwest (12.0%), and north (37.3%) (Fig. 10 A,B,C). Winds out of south or east (southwest = 6.7%; south = 2.7%; southeast = 8.0%; east = 10.7%; northeast = 4.0%) were less frequent. Average surface wind speeds out of the west,

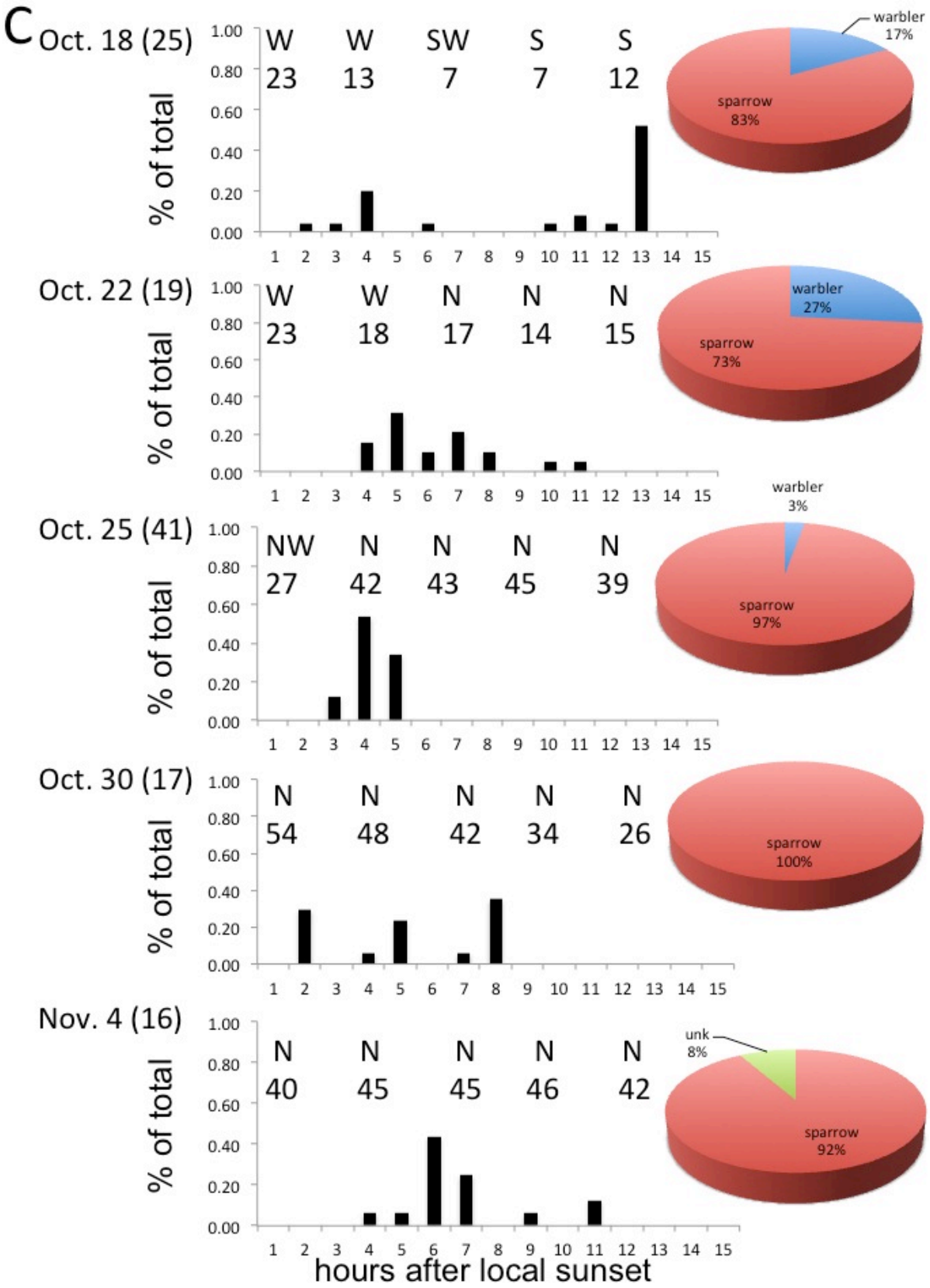
northwest, and north in 3-h blocks in which MFCs were recorded ranged from 7 k/h to 54 k/h (Fig 10A,B,C). On seven of the first ten analyzed nights, (Oct. 3-16, Fig. 10A,B), the majority of MFCs (primarily sparrows) were recorded within the first three hours after sunset, the time period referred to as 'exodus', suggesting that this site serves as a major departure area where birds, including local breeders and those on stopover, may congregate before initiating a bout of migratory flight. Four of these nights occurred while winds were out of the west or northwest while the remainder occurred with winds out of the northeast, east, or southeast.

Three of the 15 nights showed a concentration of MFCs at or near the time of sunrise, suggesting that birds were passing over or arriving at the site with winds more likely to be out of the north or northwest (Fig. 10A,B). The data for the remaining five nights (Oct. 18 – Nov. 4, Fig. 10C), wherein the preponderance of MFCs occurred well after sunset and well before sunrise, illustrate birds aloft, either *en route* in a directed trans-Gulf flight originating in the Canadian Maritimes or northern Maine coastal areas, or in redirected flights back towards the mainland after being blown offshore by strong west and northwest winds. The night of Oct. 5 had the greatest total number of MFCs, which also occurred with the highest average wind speed for each of the 3-h time blocks (35-51 k/h, all out of the north) throughout the night's recording period. Most of these MFCs occurred at or near sunrise, when north winds had decreased.

Figure 10. (BELOW) The temporal distribution of high frequency MFCs (% of night total) for 15 nights in which more than 10 calls were recorded during the 15 hours of recording beginning at local sunset are presented next to a corresponding pie chart for the three main categories of clear high frequency flight calls recorded during each night. The 'Sparrow' category is in red; 'Warbler' is in blue; and 'Unknown' is in green (see text for category descriptions). A) Oct. 3-8; B) Oct. 9-16; C) Oct. 18- Nov. 4. Local sunset occurred 20 min after the onset of recording at the beginning of the monitoring period (Sept. 30) and 36 min before the onset of recording at the end of the monitoring period (Nov. 4). Local sunrise occurred 30 min into the 12th h of recording at the beginning of the monitoring period (Sept. 30) and 18 min into the 13th h of recording at the end of the monitoring period (Nov. 4). Inserted within each graph is the average wind direction and wind speed (k/h) for each 3-h block below for during each night.


A
Oct. 3 (13)
% of total
E 7
E 15
E 16
E 8
E 21
warbler 42%
sparrow 58%
Oct. 5 (347)
N 44
N 51
N 45
N 36
N 35
unk 6%
warbler 14%
sparrow 80%
Oct. 6 (22)
N 22
N 23
N 31
N 27
N 25
unk 6%
warbler 29%
sparrow 65%
Oct. 7 (15)
NW 11
W 17
W 22
W 22
W 23
warbler 14%
sparrow 86%
Oct. 8 (22)
W 22
W 21
NW 24
NW 18
NW 19
unk 16%
warbler 16%
sparrow 68%
hours after local sunset


B
Oct. 9 (74)
% of total
W W W NW NW
15 15 18 18 17
warbler 10%
sparrow 90%
Oct. 10 (95)
% of total
NW NW N NE NE
17 16 21 15 18
unk 2%
warbler 16%
sparrow 82%
Oct. 11 (69)
% of total
NE SE SE E E
9 8 8 12 15
warbler 14%
sparrow 86%
Oct. 12 (27)
% of total
SE SE SE SE E
24 26 25 24 23
sparrow 100%
Oct. 16 (16)
% of total
W SW SW SW SW
26 22 33 36 34
sparrow 100%
1.00
0.80
0.60
0.40
0.20
0.00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
hours after local sunset


C
Oct. 18 (25)
W W SW S S
23 13 7 7 12
warbler 17%
sparrow 83%
Oct. 22 (19)
W W N N N
23 18 17 14 15
warbler 27%
sparrow 73%
Oct. 25 (41)
NW N N N N
27 42 43 45 39
warbler 3%
sparrow 97%
Oct. 30 (17)
N N N N N
54 48 42 34 26
sparrow 100%
Nov. 4 (16)
N N N N N
40 45 45 46 42
unk 8%
sparrow 92%
% of total
1.00
0.80
0.60
0.40
0.20
0.00
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
hours after local sunset

SUMMARY AND CONCLUSIONS

Timing and seasonal patterns –

The list (Table 1) of group and species-specific MFCs, including late migrants such as Yellow-rumped warblers, Palm warblers, Blackpoll warblers, and the majority of sparrows that pass through or winter in the area, is congruent with passive acoustic surveys conducted by the LAB and USFWS in the region. This list is also consistent with visual observations recorded during the same period the previous fall on Monhegan Island by Mr. Tom Magerian, an experienced technician hired by New Jersey Audubon to operate the marine surveillance radar unit (included in this report as Appendix I and listed in Appendix A in the 2011 Environmental Assessment, Department of Energy, DOE/EA #1792). However, data from numerous banding and acoustic survey activities, visual observations, and published studies illustrate that the majority of migrants of all major avian taxa begin to pass through the mid-coast Maine region in July and August (e.g., www.mainebirding.net; Cornell's E-BIRD online database, www.ebird.org; multiple banding reports for individual banding stations; references in Morris et al. 1996). Recent passive acoustic surveys conducted by the LAB and USFWS found that median dates of MFC nightly intensity for individual Neotropical warbler species such as Canada warbler, Black-and-white warbler, and Magnolia warbler, occur in mid- to late-August and early September along the northern Maine coast and mid-coast region (Tengeres & Holberton, unpublished data). Thus, the 2011 passive acoustic survey period for the DeepCwind project at Monhegan occurred extremely late in the migration season for this region and, therefore, excluded the preponderance of birds that move through the area each year.

In addition to the limited monitoring period, uncontrolled ambient noise and high winds at the exposed site obscured MFCs across all audible ranges, but particularly those made by shorebirds, waterfowl, wading birds, raptors, and many songbird migrant species. Unfortunately, options for placing the recording equipment at Lobster Cove were limited. It is highly recommended that, when recording at a site in which windy conditions are common, microphones should be placed in a protected location and at a distance from vegetation and other objects that become noisy in moderate to high winds. In spite of the limited recording time and uncontrolled sound interference in this study, however, nightly MFC counts during the recording period at Monhegan Island were within the range of those recorded during fall migration at other coastal

sites in the region (Holberton, 2011; Holberton, unpublished data). Congruent with visual observations, banding activities, and acoustic data recorded at other sites within the region during this and other years (Leppold, 2009, 2010, 2011; Holberton, 2011; Holberton, unpubl data), MFC numbers at Monhegan reflected the seasonal decline in bird numbers and the accompanying change in species group composition towards a sparrow/finch dominated distribution. Some of these late arriving species, such as Song sparrow, White-throated sparrow, and Dark-eyed junco, are facultative migrants that will make initial movements away from the breeding grounds but will remain as far north as possible as long as weather conditions and food availability allow (Holberton 1993 and references therein). Thus, these species can continue to make migratory movements throughout autumn and winter.

Patterns of MFCs, surface wind direction and surface wind speed -

Within-night temporal patterns of MFC distribution at the Monhegan recording location suggest that the site near the offshore deepwater test area is a multi-purpose one. Three basic patterns emerged from this monitoring effort. There were nights in which the majority of MFCs occurred either well after sunset, soon after sunset, or only near dawn. On approximately half of the 15 nights in which more than 10 MFCs were detected, all or almost all MFCs occurred within the first three hours after sunset, the period known as 'exodus' when birds are ascending as they initiate a flight (Able 1973). This pattern of activity soon after sunset is congruent with radar data collected by New Jersey Audubon at this site the previous year: during the last half of the 2010 fall migration season, the rate of radar 'targets' peaked in the second hour after sunset (Mizrahi, 2011). These results collectively suggest that this site serves as a major departure area. As shown in Figure 5, the recording equipment was situated within an area dominated by scrub-shrub habitat that many species including sparrows are readily attracted to on stopover sites. Thus, birds may congregate in this area before initiating a bout of migratory flight. Although surface wind direction can influence when exodus occurs (Gauthreaux & Able, 1970; Able, 1973), flights initiated from Monhegan Island in 2011 occurred regardless of wind direction or wind speed. The survey site, located at the southwest end of the island, offers an unobstructed view of the mainland. This area at Lobster Cove, adjacent to the deepwater test site, is likely to concentrate migrants not only because the habitat there may allow them to replenish energy stores needed to resume migration in a timely fashion but it may also serve as a strategic site for departure to the

mainland (c.f. Covino & Holberton, 2011). This hypothesis is supported by the previous year's radar data in which the mean direction of 'night targets' at this site during late migration (1 October – 30 November) was to the southwest at 232 degrees (Mizrahi, 2010), in the general direction towards the coast, a finding also consistent with the southwest track of radar targets documented by Drury and Nisbet (1964) on a larger scale along the southern Maine coast in autumn.

Areas that concentrate migrants, either because they provide resources such as food availability and refuge from predators or pose topographic features that minimize flight distance to their next destination, should be avoided for placement of structures such as buildings, communication towers, and wind energy turbines. Recent studies have shown that collision risk assessments may underestimate impacts because individual birds on migration often make multiple local flight forays in the departure area soon after sunset before finally departing on migration altogether (Mills et al. 2011; Taylor et al. 2011). These repeated local round-trip forays, often as far as 10 km, are at low altitudes and may be exploratory as birds assess topography and wind conditions before committing to a true departure from the area. The results from Taylor and colleagues (Mills et al. 2011; Taylor et al. 2011) illustrate that collision risk for birds concentrated in departing from an area may be higher than risk assessment models currently estimate because individual birds at stopover sites are likely to eventually spend a significant amount of total time aloft in the area at heights well within the rotor swept zone.

In addition to lower flight heights during ascent and descent during migration (Cooper & Ritchie 1995), radar studies have shown that, for many landbird migrants, maximum flight heights achieved over water are lower than that reported for over land, presumably to take advantage of lower air turbulence and higher, more consistent wind speeds found over the ocean (Hüppop et al. 2006 and references therein). Landbird migrants are also more likely to fly at lower altitudes along coastlines compared to inland sites (Alerstam et al. 1978; Hüppop et al. 2006). Species such as Yellow-rumped warblers and Dark-eyed juncos have been documented flying along the southern New England coast in autumn at altitudes less than 30 m (Baird & Nisbet 1960). These observations are congruent with results of the 2010 marine surveillance radar study at Lobster Cove showing that the proportions of radar targets observed at or below 50 m as well as targets observed between 51 and 100 m above the water's surface were higher during

the late migration season (1 October – 30 November) compared to the earlier fall migration period (Mizrahi, 2011).

Not only are flight heights lower along coastlines and as birds near their destination (Cooper & Ritchie 1995), they can be affected by weather conditions, with birds more likely to fly low in foggy conditions and under the ceiling of heavy cloud cover (Bruderer, 1997; Hüppop & Hilgerloh, 2012). Thus, collision risk for birds along the Gulf of Maine coastal areas may be compounded by the fact that not only do they have a greater tendency to fly at low altitudes under optimal conditions, the region, particularly the coastal waters near the mouth of Penobscot Bay, experiences the highest frequency of days with low visibility, with maximum periods occurring during the early morning hours, just before sunrise, from May to October (Hayes, 2009), causing migrants to further reduce flight heights. Plans for construction as well as operational and maintenance activities associated with coastal land-based, near-shore and deepwater wind energy operations will need to take into consideration the fact that under these conditions artificial illuminations attract nocturnal migrants and may lead to mass collisions with obstacles, particularly where disoriented birds may have no alternatives for landing (Jones & Francis, 2003; Gauthreaux & Belser, 2003, 2006; Evans et al., 2007; Drewitt & Langston, 2008; Hüppop & Hilgerloh, 2012).

Origin of landbird migrants at Monhegan -

In addition to hundreds of thousands of waterfowl, shorebirds, and seabirds that move through the Gulf of Maine coastal areas and offshore islands, the region serves as a major flyway system for as many as a half a million landbird migrants, with birds using a variety of strategies to move along the coast, 'island hop', or make non-stop overwater flights from Nova Scotia and New Brunswick (Drury & Nisbet, 1964; Leppold & Holberton, 2010; Baird & Nisbet, 1960; Nisbet & Drury 1967, 1969; Drury & Keith 1962; Richardson 1972, 1978; Williams et al. 1977, Williams & Williams 1978; Peckford & Taylor 2008; Covino & Holberton 2011). While a preponderance of these birds represent breeding populations in the Canadian Maritimes, Quebec, Ontario, and Maine, stable isotope studies have shown that a significant proportion of migrant songbirds occurring on offshore islands as well as along the Maine coast originate from breeding populations across North America, with some birds coming from as far west as Alaska and western Canada (Holberton 2011, Holberton & Hobson, unpubl data). Under region-wide

weather conditions optimal for flight, major movements of migrants across the Gulf and along the coast are often 'broad front' movements rather than narrow 'corridors'. This is supported by the temporal patterns of daily radar target intensities of radar data collected at Lobster Cove on Monhegan Island in 2010 being positively correlated with temporal patterns of visual counts and banding activity co-occurring on Metinic Island almost 18 km to the northeast of Monhegan Island (Leppold & Holberton 2010). Further, temporal patterns of MFCs during fall migration in 2010 at sites inland (Hampden), on the mainland coast (Petit Manan Point), and on Metinic Island in 2010 showed similar changes in nightly intensity although these sites were more than 90 km apart from each other (Holberton 2011).

Summary -

Over 300 bird species comprising all major avian taxa have been documented in the Gulf of Maine region, and 80% of these are migrants on their way to or from the breeding grounds across the northern regions of North America. Boreal breeding birds, which comprise a significant portion of bird species moving through the Gulf of Maine area are of particular concern as many of these breeding areas are of particular risk from global climate change and populations are experiencing rapid declines (North American Bird Conservation Initiative Canada, 2012). Many of these species are currently state and/or federally listed in Maine (USFWS, 2008; MDIFW, 2011). It is well established that coastal areas concentrate birds during migration (Ralph, 1981), and Maine's coastal areas and islands are not only popular ecotourism sites for seabird viewing during the breeding season, but are major sites for birders throughout both migration periods. Monhegan Island, in particular, is a destination 'hotspot' for commercial bird tours because of the number and diversity of migrant landbirds that occur there during spring and fall migration. More extensive study is needed to fully understand bird activity in the Monhegan Island area.

The limited time period of deployment and the reduced size of the University of Maine-DeepCwind test turbine, as originally described for the deepwater test site at Monhegan Island, is not likely to adversely affect migrant landbird behavior. However, lighting during construction and operation activities for the project should be minimized during nighttime periods at any time of the year, especially when visibility is low. Given how migrant landbirds negotiate the complex topography of this major flyway region, it should be recognized that the current assessments of

potential direct and indirect impacts of land-based and offshore commercial scale wind energy development elsewhere are not likely to be readily extrapolated to the coastal and offshore areas of the Gulf of Maine.

ACKNOWLEDGEMENTS

Doreta Schwier provided much critical logistic support on Monhegan Island throughout the monitoring period. David Bridges helped set up the equipment at the monitoring site and analyzed much of the data. Support was provided by funds from the American Recovery and Reinvestment Act program (U.S. Department of Energy, #DE-EE0002981) awarded to the University of Maine and DeepCwind Consortium.

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Table 1. List of landbird migrant bird species or species groups for whom MFC were identified during passive acoustic survey of nocturnal migration at Lobster Cove, Monhegan Island, near the University of Maine Deepwater Offshore Wind Test Site, 30 September – 4 November, 2010. An * indicates the species is listed as 'Species of Concern' by Maine Department of Inland Fisheries and Wildlife (March 1, 2011), and # indicates listed as Birds of Conservation Concern or "Important Neotropical Migrant Species in Maine" by USFWS for Region 5 (Northeast Region BCC, 2008).

Blue Jay, *Cyanocitta cristata*
American Crow, *Corvus brachyrhynchos*
Black-capped Chickadee, *Poecile atricapilla*
Golden-crowned Kinglet, *Regulus satrapa*
American Robin, *Turdus migratorius*
Vermivora spp (all characterized by a 'double up' spectrogram indistinguishable among three possible species within this genus)
- Tennessee warbler, *V. peregrina* *
- Orange-crowned warbler, *V. celata*
- Nashville warbler, *V. ruficapilla*

Northern parula, *Parula americana* #
Black-throated Blue warbler, *Setophaga caerulescens* #
Palm warbler, *Setophaga palmarum*
Common Yellowthroat, *Geothlypis trichas*
American Redstart, *Setophaga ruticilla* *
'Zeep' complex that includes:
- Yellow-rumped warbler, *Setophaga coronata* *
- Blackpoll warbler, *Setophaga striata*
- Yellow warbler, *Setophaga petechia* *
- Magnolia warbler, *Setophaga magnolia*
- Bay-breasted warbler, *Setophaga castenea* #
- Cape May warbler, *Setophaga tigrina*
- Blackburnian warbler, *Setophaga fusca*

Am. Tree Sparrow, *Spizella arborea*
Chipping Sparrow, *Spizella passerina*
Savannah Sparrow, *Passerculus sandwichensis*
Fox Sparrow, *Passerella iliaca* *
Song Sparrow, *Melospiza melodia*
Lincoln's Sparrow, *Melospiza lincolnii*
Swamp Sparrow, *Melospiza georgiana*
White-throated Sparrow, *Zonotrichia leucophrys* *
Dark-eyed Junco, *Junco hyemalis*

BIRD SITINGS OFF MONHEGAN ISLAND'S LOBSTER COVE, JULY 2, 2010 TO OCTOBER 16, 2010

Source: **Maine-birds** *"an email forum devoted to the discussion of birds and birding in the state of Maine. The primary function of the list is to provide an efficient means of reporting wild bird sightings in the state. Including discussions on identification, behavior, conservation, etc."*

Unless otherwise identified, the following bird sitings on Monhegan and in transit to and from the island were made by ornithologist Tom Magarian and submitted by him to the Maine -Bird online forum data archive . They are being forwarded here with his acknowledgement.

References to Lobster Cove are highlighted; the air and water off Lobster Cove are proposed for development of the Deepwater wind turbine test area. Birds using that area would be the ones most likely to be directly impacted by the test windturbines. The following narratives and lists detail birds using the area during the time of year when the proposed prototype turbines would be operating directly offshore.

Tom Magarian tmagarian@alumni.unity.edu is a professional ornithologist who works with New Jersey Audubon. He has been tasked to carry out radar sitings of birds off Lobster Cove, Monhegan. The visual observations recorded below are a supplement to those readings, by this highly qualified individual.

TOM MAGARIAN:

Monhegan July 11, 2010 Today there was a group of about 20 greater shearwaters off from Lobster Cove following a school of fish that were breaking the water after baitfish. Yellow warblers, house wrens, song sparrows, common yellow-throats, common grackles, american robins, cedar waxwings, american goldfinches, and american crows are all making there presence known.
Cheers!
-Tom M.

Monhegan July 11, 2010
Tom M. I just did about an hour of seawatching off Lobster Cove. There were some shearwaters, gulls, and a few terns working over a school of bait that was being pushed up by something. I did not see any whales or dolphins, but did see some big splashes. Puffins were mostly heading out to sea. Some guillemots and eider were in the surf and near the island. Sooty shearwater was most numerous followed by greater, and a couple of cory's were in the mix. Here is the list.
sooty shearwater - 25
greater shearwater - 15
cory's shearwater - 2
wilson's storm-petrel - 10

atlantic puffin - 15
black guillemot - 3
common eider - 5
laughing gull- 13
common tern - 7
unknown large alcid - 2 (most likely puffins)
Cheers!
-Tom M.

Monhegan July 12, 2010

This morning I seawatched at Lobster Cove for 45 min and clinched the fourth species of shearwater in less than 24 hours from shore. The first shearwater was a wonderful looking manx heading east and not all that far out. And then the only other shearwaters were five cory's!
Here is the rest.
common tern - 35
black guillemot - 6
wilson's storm-petrel - 7
arctic tern - 2
roseate tern - 2
laughing gull - 6
common loon - 1
northern gannet - 2
Interesting sighting of 3 meduim sized shorebirds heading south. I got on them heading away and could not put a name to them, one looked different from the other two.
Mid day I walked the trails up to the north end and back and picked three swainson's thrushes, one was singing near Black Head. It was great to hear one again, it has been a to long. There were a handful of black-throated green warblers, a couple of common yellowthroats, one flock of golden crowned kinglets, a couple of singing winter wrens, and a singing brown creeper.

This evening I seawatched again from Lobster Cove for a half as it was getting late and there was a bit of sea mist. I did see one cory's, two greater, and one sooty shearwater. One puffin was heading west. That was about all worth noting here.
Cheers!
-Tom M.

July 14, 2010

Yesterday evening from **Lobster Cove**
northern gannet - 30
atlantic puffin - 16
greater shearwater - 7
cory's shearwater - 16
sooty shearwater - 36
manx shearwater - 1
common tern - 14
black guillemot - 5
wilson's storm-petrel - 11
laughing gull - 18
Cheers!
-Tom M

JULY 15, 2010 one immature sharp-shinned hawk.
The evening of the 15th from Lobster Cove
Black Guillemot - 4
Atlantic Puffin - 22
Sooty Shearwater - 2
Greater Shearwater - 2
Northern Gannet - 39
Laughing Gull - 17
Wilson's Storm-petrel - 3
Common Tern
Harbor seal - 3
Harbor Porpoise - 5
All but one puffin heading west.

July 16, 2010

This evening an hour spent seawatching from Lobster Cove turned up few shearwaters, but was good for gannets and west bound puffins.
black guillemot - 4
atlantic puffin - 22
northern gannet - 39
sooty shearwater - 2
greater shearwater - 2
wilson's storm-petrel - 3

laughing gull - 17
common tern
common eider
double-crested cormorant
harbor seal - 3
harbor porpoise ~5
Cheers!
-Tom M.

July 17, 2010 Morning

In the morning on the 17th from Lobster Cove
Atlantic Puffin - 3
Northern Gannet - 18
Laughing Gull - 13
greater shearwater - 14
Black Guillemot - 4
Razorbill - 1
Wilson's Storm-petrel - 1
Common Tern
Roseate Tern - 1
Arctic Tern - 4

Monhegan July 17, 2010 PM
The evening of the 17th Lobster Cove
Cory's Shearwater - 2
Sooty Shearwater - 5
common Tern
Northern Gannet - 17
Laughing Gull - 6

Monhegan July 18, 2010
On the 9am boat on the 18th
Black Guillemot - 52 (most were at the north end of Manana in two big flocks)
Northern Gannet - 25
Great Cormorant - 1
Common Tern
Arctic Tern - 3
Monarch Butterfly - 1

On the 3pm boat back
Black Guillemot - 8
Great Cormorant - 2
Northern Gannet - 10
Common Tern
Laughing Gull

MONHEGAN July 19, 2010 This morning the 19th
One Semi-palmated Plover heard over the harbor and a female kestrel near Lobster Cove.
Cheers!
-Tom M.

Monhegan July 23, 2010
There have been sporadic migrants the last few days. Eastern phoebe, Short-billed Dowitcher, semi-palmated plover, and a few others.

Today there was a great blue heron on Manana and possibly a turkey vulture (I went out without my bins). Also today there was a male purple finch and a killdeer which were new. Also of note were about 125 wilson's storm-petrels off from Lobster Cove. Also, there are a few carolina wrens on the island. I was not expecting these here. does anyone know how regular they are this far north?
Cheers!
-Tom M.

Monhegan July 24,2010

Today i took the 9am to the mainland and the 3pm back out. They trip in was the better trip. both were fogged in, but it was thicker in the afternoon. the early trip surprised me with all four shearwaters!
am boat
cory's shearwater - 1
greater shearwater - 1
manx shearwater - 1
sooty shearwater - 1
wilson's storm-petrel - 16
black guillemot - 20
northern gannet - 1
arctic tern - 1

pm boat
wilson's storm petrel - 6
black guillemot - 9
Cheers!
-Tom M.

Monhegan July 25, 2010

This morning seawatching from Lobster Cove (for 45mins) again proved worth while. I was also treated to a decent look at a fin whale and saw a distant blow, but was unable to ID that one.
wilson's storm-petrel - 16
northern gannet - 12
sooty shearwater - 3
greater shearwater - 30
black guillemot - 1
common eider
common tern
laughing gull - 13
Other migrants
yellow warbler - 3
yellow-rumped warbler- 1?
This evening a brief watch at Lobster Cove for 15 minutes
atlantic puffin - 3
wilson's storm-petrel - 20
northern gannet - 8
balck guillemot - 2
common eider
common tern
laughing gull - 14
And to end the evening a migranting great blue heron flew south down the island headed for the open sea just before 8pm.
Cheers!
-Tom M

July 30, 2010
This morning from Lobster Cove:
manx shearwater - 1
northern gannet - 5
greater shearwater - 6
wilson's storm-petrel - 8
Some of the above migrants this morning, mostly the shorebirds and

yellow warblers.

But last night was the biggest migration event of the fall so far!!!!!!! And I slept in! Anyways, after missing a great morning and completing some of my duties this afternoon I was all stressed out, but then miraculously, during the height of stress, I hear what sounds like....could it really be? After asking about another southern, but pushing north species and get a lot of feedback. (which I really enjoyed) Carolina wrens are hear this far north.

But white-eyed vireo? I almost blew it off at first. But after listening to the bird sing for 5-10 minutes what else could it be? Oh, and for anyone who did not know the "4 letter code", Richard Crossley's new guide will be a godsend! So, I maybe jumping the gun here, but I am pretty sure that WEVI is not all that common this far north??? Anyways, I have heard plenty to know the song. It was not a mimic (ie thrasher, cat bird, or mocker). Having no seen the bird is suspect i know, but hey, I do not want to piss off the land owners out here.
All I know is when I here "QUICK! waitor, check please, CHECK! that there are not many other songs that compare, but please enlighten me if there are.
Cheers!
-Tom M.

Monhegan AUGUST 3, 2010
Today I spent a half hour seawatching from Lobster Cove and have the following to report
manx shearwater - 1
greater shearwater - 16
sooty - shearwater - 1
wilson's storm petrel - 13
northern gannet - 12
laughing gull - 2
common tern
Then a couple "in passing" sightings from later in the day
1445 - eastern kingbird - 3
1930 - BLACK-LEGGED KITTIWAKE - 1(young bird seen flying around the harbor)
Cheers!
-Tom M.

August 6, 2010

[Today] I hit the mainland and took the 1230 boat to Port Clyde. Three puffins flying out to sea were a real treat and an excellent look as well!
black guillemot - 5
ATLANTIC PUFFIN - 3
sooty shearwater - 1
harbor porpoise and seals were seen.

Yesterday evening in downtown Camden after the heavy rain I was treated to at least seven osprey soaring overhead!

Monhegan August 7, 2010

Today on the 3pm out of Port Clyde
great cormorant - 1 (about a mile or two out on one of the small islands)
black guillemot - 5
northern gannet - 25
greater shearwater - 1
manx shearwater - 1
osprey - 2
harbor porpoise and seals

This evening in the southern part of the village I was treated to a young OLIVE-SIDED FLYCATCHER. I presume that they do not nest on the island, so no doubt that this was a migrant. And then I seawatched for about a half hour from Lobster Cove very late in the day.
black guillemot - 1
greater shearwater - 6
manx shearwater - 1
northern gannet - 48
laughing gull - 1
common tern
Cheers!
-Tom M.

AUGUST 10, 2010

A brief mid morning bit of seawatching was rather uneventful. There was more action in the trees around the village. In the evening seawatching was slightly more fruitful.

am seawatching
northern gannet - 20
laughing gull - 2
common eider
wilson's storm-petrel - 1

Around town
magnolia warbler - 1
northern cardinal
carolina wren
golden-crowned kinglet
blue jay
blackpoll warbler - 1
blackburnian warbler - 1
gray catbird
red-breasted nuthatch
semi-palmated plover - 1

pm seawatching
least sandpiper - 6
tree swallow - 5
northern gannet - 13
CORY'S SHEARWATER - 1
wilson's storm-petrel - 1
mourning dove
Cheers!
-Tom M.

AUGUST 11, 2010

Yesterday the 11th proved to be an excellent morning to be out. There have been a few good migration events out here since mid/late July, but they keep getting better. There were warblers in the air calling and the diversity has increased, however it was hard to see them and I am lacking in the flight call dept, but the bulk of what I heard were yellow warblers. There also seemed to be a good push of red-breasted nuthatches, as their numbers were much higher than any other time I have walked the village, and the season's first "farting" dickcissel was a nice treat!

red-breasted nuthatch - 18
american robin - 4
mourning dove - 4

blue jay - 5
carolinia wren - 7
american crow - 8
american goldfinch - 14
cedar waxwing - 80
northern cardinal - 5
common yellowthroat - 5
herring gull
great black-backed gull
ring-necked pheasant - 4
purple finch - 3
red-winged blackbird - 6
golden-crowned kinglet - 8
song sparrow - 6
northern gannet - 22
double-crested cormorant
black guillemot - 14 (1st juv seen on the water in the harbor)
common eider - 8
laughing gull - 1
black-capped chickadee - 10
house wren - 1
gray catbird - 6
chipping sparrow - 1
lesser yellowlegs - 2
least sandpiper - 30
baltimore oriole - 1
yellow warbler - 20 (definitely a big under count)
blackpoll warbler - 3
semi-palmated plover - 2
DICKCISSEL - 1 (heard in flight over harbor headed south towards
Manana, but never saw it)
semi-palmated sandpiper - 3
mallard
common grackle - 1
bobolink - 3
savannah sparrow - 1
blackburnian warbler - 1
black-throated green warbler - 3
american redstart - 1
black and white warbler - 1
trails flycatcher - 1
barn swallow - 1
downy woodpecker - 1
dark-eyed junco - 2

Cheers!
-Tom M.

AUGUST 16, 2010

I seawatched mid afternoon from Lobster Cove and the change of weather has got the shearwaters moving again. I wish I gotten out there earlier and had more time to spend. Cory's and greaters were pasing by heading NE. Some gannets were in the mix, but mostly headed SW or milling about.

cory's shearwater - 10
greater shearwater 34
northern gannet - 35
black guilliemot - 1
common eider
unidentified shorebird - 2 (heading NE, possibly phalaropes)
Cheers!
-Tom M.

AUGUST 18, 19, 20, 2010

Migration is starting to pickup out here on the island. This morning I saw my first peregrine and osprey, and yesterday my first harrier of the season. Also this morning I heard numerous semi plovers calling as they headed south, mostly single birds I presume. I did see one flock of about four. I heard them as I was getting things together out the window, and the first southbound flock of double-crested cormorants went winging by. Last evening while catching mackerel from the warf after dark I heard a handful of yellow warblers and a few call notes that I did not know. The best was hearing an oystercatcher call twice as it flew by to he west and was headed south! Here are the last few days recap:

AUGUST 18, 2010

solitary sandpiper - 1

On the 9am boat leaving the island

wilson's storm-petrel - 15
black guillemot - 6
laughing gull

common eider
great cormorant - 1 (adult)
northern gannet - 300

On the 3pm boat back
osprey - 1
common eider
black guillemot - 8
common loon - 1
northern gannet - 20

Harbor porpoise and seals were easy to see on both trips.

19 AUG

northern harrier - 1 (imm)
-After sunset-
yellow warbler - 5
AMERICAN OSYTERCATCHER - 1

20 AUG

osprey - 1
northern gannet - 10
peregrine falcon - 1 (imm)
laughing gull - 7
black guillemot - 1
tree swallow - 5
common eider
double-crested cormorant - 50 (one flock headed south of about 40)
Cheers!
Tom M.

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AUGUST 21, 2010
This morning I got a late start, but still saw some interesting birds. Warblers were hard to come by, I only heard a few call notes that might have been yellows. Red-breasted nuthatches seemed more abundant again this morning. I only birded the south end of town down to Lobster Cove.

red-breasted nuthatch - 6
carolina wren - 2
chipping sparrow - 1
eastern kingbird - 12
purple finch - 4
eastern phoebe - 1
laughing gull - 35
black guillemot - 16
bobolink - 1
double-crested cormorant - 50 (one southbound flock of 20)
common eider - 75 (a couple of decent rafts)
northern gannet - 12
parasitic jaeger - 1 (non-breeding adult chasing a laughing gull, then a herring gull attempted to chase it!)
spotted sandpiper - 6
great cormorant - 1 (adult on one of the rock outcrops)

Cheers!
-Tom

AUGUST 22, 2010
Last night after it got dark I heard a few warblers and one veery while fishing from the wharf for mackerel. This morning i had a flyby pectoral sandpiper and there was a flock of about 50 tree swallows at the same location. Then mid afternoon from Lobster Cove, a brief bit of seawatching turned up three shearwaters.

Last evening at the wharf

veery - 1
yellow warbler - 3
american redstart - 3
unknown warbler - 5

This morning from the wharf

pectoral sandpiper - 1
tree swallow - 50

Seawatching from Lobster Cove

CORY"S SHEARWATER - 1

MANX SHEARWATER - 1
greater shearwater - 3
northern gannet - 25
laughing gull - 10
bonapartes gull - 1
black guillemot - 3
black-bellied plover - 1 (still in alternate plumage)
common eider

Cheers!
-Tom M.

AUGUST 23, THROUGH 27, 2010

Migration seems to be picking out here. There have been a couple of recent days with shearwaters. Waterbirds have started moving down from he north. The warblers are arriving. At night it is quite easy to here call notes. (I wish I knew more of them). The last couple of days I heard dickcissels in the morning and today there may possibly be more than one around. I finally saw one perched a top a spruce across from The Trailing Yew about an hour ago. Here is a recap of the last few days.

23 Aug

northern gannet - 12
greater shearwater - 1
black guillemot - 4
common eider
blue-winged teal - 1
ring-billed gull - 1
belted kingfisher - 1
tree swallow - 30
american redstart - 1
yellow warbler - 1
semi-palmated plover - 7
spotted sandpiper - 1

24 Aug

merlin - 1
peregrine falcon - 1
eastern kingbird - 10

northern gannet - 40
common eider
great blue heron - 1
sharp-shinned hawk - 1

25 Aug

sharp-shinned hawk - 1
northern gannet - 20
black - guillemot - 5
osprey - 1
common raven - 2

26 Aug

DICKCISSEL - 1 (heard from The Trailing Yew while I was eating breakfast, could have been two birds?)
northern gannet - 60
greater shearwater - 21
cory's shearwater - 3
red-necked grebe - 8 (one flock heading NE the same as the shearwaters)
unknown large shearwater - 1
Listening to night migrants:
veery - 2
wood thrush - 1
yellow warbler - 5
american redstart - 2
semi-palmated plover - 1
-numerous other call notes went unidentified

27 Aug

DICKCISSEL - 2? (one heard from The Trailing Yew this morning, one heard further south along the road later, and one heard and seen mid day across from The Trailing Yew)
lesser yellowlegs - 1
bobolink - 7
tree swallow - 25
red-breasted nuthatch - 6
cape may warbler - 1
white-winged scoter - 1
purple finch - 4
eastern kingbird - 2

eastern phoebe - 2
blue-winged teal - 1
wilson's warbler - 3
common raven - 2
red-eyed vireo - 1
merlin - 1
semi-palmated sandpiper - 1

Harbor porpoise - 3
harbor seal - 2
grey seal - 1

Cheers!
-Tom M.

AUGUST 27, 2010

This morning was rather birding on the island. I bumped into a couple birding and they told me I had missed a lark sparrow by minutes by the school house. There were a number of warblers and others around. Another blue-gray gnatcatcher by the Winter Works. It could have been the same as the one the evening before. Here is the tally:

coopers hawk - 1
merlin - 1
sharp-shinned hawk - 1
purple finch - 5
northern gannet - 15
black guillemot - 3
bobolink - 12
black-throated green warbler - 3
yellow warbler - 8
american redstart - 1
BLUE-GRAY GNATCATCHER - 1
baltimore oriole - 7
eastern kingbird - 3
red-eyed vireo - 4
belted kingfisher - 1
blackpoll warbler - 1
northern waterthrush - 4
least sandpiper - 3

Cheers!
-Tom M.

AUGUST 29, 30, 11, 2010

The last few days have been good out on the island. The mornings are relatively birdy. The accipts and falcons are around now. Warblers are about and bobolinks are more common. The seabirding has been slow, but gannets are easy to see. Here is a recap.

29 AUG

northern waterthrush - 1
yellow-rumped warbler - 1
common yellowthroat - 1
red-breatsed nuthatch - 1
carolina wren - 1
bobolink - 1
northern gannet
gray catbird - 1

30 AUG

american kestrel - 2
eastern wood-peewee - 1
sharp-shinned hawk - 3
merl - 1
common eider
northern gannet - 15
black guillemot - 2
eastern kingbird - 2
red-breasted nuthatch - 1
one unidentified medium passerine cam in off the water to Lobster Point from the SW at 0920. It makes you wonder how far offshore it was and how long it had been flying to find land.

31 AUG

downy woodpecker - 1
blue jay - 5
common grackle - 2
red-winged blackbird - 2
purple finch - 5
cape may warbler - 7

red-breasted nuthatch - 10
european starling - 4
cedar waxwing - 100
eastern kingbird - 4
wilson's warbler - 1
american warbler - 17
common yellowthroat - 1
carolina warbler - 2
gray catbird - 1
yellow warbler - 2
yellow-rumped warbler - 2
bobolink - 30
american kestrel - 4
merlin - 3
peregrine falcon - 1
sharp-shinned hawk - 1
black guillemot - 2
northern gannet
unidentified warbler - 15

Cheers!
-Tom M.

AUGUST 31 THROUGH SEPTEMBER 6, 2010
This morning was rather birdy on the island. The last few days have been good for bobolinks. Not to much was blown by the storm. The number of gulls did increase after though. Here is a recap.

31 AUG
chimney swift - 1 (late in the day)

1 SEP (before and after sunset at the wharf while fishing for mackerel)
veery - 1
wilson's snipe - 1
yellow warbler - 3
blackpoll warbler - 1
unknown warbler - 6

2 SEP
purple finch - 8
blue jay - 10

brown-headed cowbird - 1
yellow warbler - 1
eastern kingbird - 13
unknown warbler - 6
carolina wren - 2
bobolink - 3
BLUE-GRAY GNATCATCHER - 1 (by the Trailing Yew)
european starling - 3
red-breasted nuthatch - 1
sharp-shinned hawk - 1
gray catbird - 1
laughing gull - 1
black-crowned night heron - 2 (after sunset)

3 SEP
bobolink - 35
pectoral sandpiper - 2

4 SEP
unknown large shearwater - 1
cory's shearwater - 2
northern gannet - 60
common eider
black guillemot - 1
laughing gull - 12
sterna spp - 4 (common/arctic/roseate/forster's)
ring-billed gull - 1
semi-palmated plover - 1

6 SEP
red-breasted nuthatch - 3
bobolink - 27
LARK SPARROW - 3 (one up the hill from The Novelty, and two together by the Lupine Gallery that flew up to the school house, all immatures)

american robin - 6
carolina wren - 2
semipalmated plover - 1
baltimore oriole - 1
purple finch - 20
purple martin - 1
black guillemot - 7
chipping sparrow - 1
solitary sandpiper - 1

yellow warbler - 1
great blue heron - 1
BLUE-GRAY GNATCATCHER - 1 (by the Trailing Yew)
merlin - 2
eastern kingbird - 1
blackpoll warbler - 3
gray catbird - 2
osprey - 1
great cormorant - 4 (one flock heading south)

Cheers!
-Tom M.

SEPTEMBER 9, 10, 2010
Today was decent with good variety on the island. Yesterday was most likely as good, but I did not get out. I was out both nights and there were numerous flight calls, as well as this evening. These seem to be the best movements of the fall so far. Hopefully, tomorrow will be as good as today!

9 SEP
wilson's snipe - 2 (after sunset)

10 SEP
In the morning

american kestrel - 2
american redstart - 3
greater yellowlegs - 1
common yellowthroat - 2
red-breasted nuthatch - 2
blackpoll warbler - 4
purple finch - 1
blackburnian warbler - 3
black-throated green warbler - 2
red-eyed vireo - 3
chipping sparrow - 1
bobolink - 15
northern parula - 1

common raven - 1
solitary sandpiper - 1
gray catbird - 2

This afternoon

rose-breatsed grosbeak - 1
nashville warbler - 1
american redstart - 3
carolina wren - 3
red-eyed vireo - 5
black -throated green warbler - 1
common yellowthroat - 3
yellow-rumped warbler - 1
northern waterthrush - 1
magnolia warbler - 2
black and white warbler - 2
western palm warbler - 1
merlin - 1
purple finch - 1
brown thrasher - 1
bobolink - 1

Cheers!
-Tom M.

SEPTEMBER 11, 12, 13, 2010
It was a great weekend to be out on the island, just ask the 13 year old kid who must tracked every bird on the island that was present. He reported a handful of philadelphia vireos, a couple of yellow-throated vieros, a few lincoln's sparrows, and a scarlet tanager. He and I saw possible mourning warbler, it was a quick look and fleeting look.

The legendary Tom Martin has arrived on the island. He got settled in on Friday. So the seed is being puy out and he keeping is constant vigil from the porch.

Here is most of what was around, or at least what I saw.

11 SEP

belted kingfisher - 3
blackpoll warbler - 3 (definitely an under count as many zip call notes were heard)
red-breasted nuthatch - 3
purple finch - 22
blue jay - 3
cedar waxwing - 12
merlin - 3
carolina wren - 3
least flycatcher - 2
yellow-rumped warbler - 1
american goldfinch - 12
semi-palmated plover - 1
gray catbird - 7
downy woodpecker - 1
black-capped chickadee - 12
red-eyed vireo - 5
black-throated green warbler - 6
common yellowthroat - 4
ruby-throated hummingbird - 3
bobolink - 15
black guillemot - 11
bald eagle - 3
cooper's hawk - 1
black and white warbler - 3
american black duck - 1
northern harrier - 2
swamp sparrow - 1
canada warbler - 1
chestnut-sided warbler - 1
northern flicker - 1
eastern kingbird - 2
sharp-shinned hawk - 2
ruby-crowned kinglet - 1
rose-breated grosbeak - 1
brown thrasher - 1

12 SEP
american goldfinch - 3
northern flicker - 5
common raven - 2
gray catbird - 3
black-capped chickadee - 6

least flycatcher - 2
red-eyed vireo - 3
black guillemot - 1
american black duck - 1
belted kingfisher - 1
blue jay - 2
baltimore oriole - 3
common yellowthroat - 2
american kestrel - 1
merlin - 2
wilon's snipe - 1
northern harrier - 2
red-breasted nuthatch - 3
purple finch - 4
cedar waxwing - 18
sharp-shinned hawk - 1
canada warbler - 1
cooper's hawk - 1
brown creeper - 1
american robin - 1
semi-palmated plover - 4
northern gannet - 4

13 SEP
northern flicker - 8
blue jay - 9
gray catbird - 6
black-capped chickadee - 19
carolina wren - 2
purple finch - 4
brown thrasher - 1
red-eyed vireo - 6
merlin - 1
red-breasted nuthatch - 6
least flycatcher - 1
white-winged scoter - 2
chestnut-sided warbler - 1
northern parula - 1
american robin - 3
sharp-shinned hawk - 1
carolina wren - 1
belted kingfisher - 1
semi-palmated plover - 1
brown creeper - 1

golden-crowned kinglet - 4
common yellowthroat - 1
whimbrel - 1 (flying NE seen from Hornes Hill)

Cheers!
Tom M.

SEPTEMBER 15, 2010
Hello Maine Birders:
The highs were high and the lows were low out on Monhegan yesterday (9/15/10). It started off really challenging but in the end we all left with big smiles on our faces.
It was painful trying to scare up songbirds. It was the slowest I've seen on my trips to Monhegan (spring or fall). We walked for ten minutes before encountering our first passerine - a chickadee. But there were a few gems to be had. A Blue-gray Gnatcatcher was doing its thing in an apple tree next to the church and the Lark Bunting was very cooperative (thanks Bryan and co.!) at White head.
The non-songbirds were the real highlights. A Blue-winged Teal and a Solitary Sandpiper in the Ice Pond. An American Bittern posed at the edge of the reeds down by the pump house. There was an amazing Northern Gannet show off White Head: 100+ birds soaring and plunging. I could have stayed there all day.
The most dramatic bird activity was the raptors. By mid-morning the NW winds really kicked up and there wasn't a moment after that when you couldn't spot a Sharp-shinned or a Merlin overhead. When we were down at Lobster Cove, 6-10 raptors were in the sky at all times dog-fighting, soaring, and pursuing prey. A few Peregrines, harriers, and Osprey rounded out the species list. A Merlin narrowly missed picking off the Lark Bunting while we watched it.
Good birding,
Eric Hynes

SEPTEMBER 27, 2010

Kristen Lindquist Cold and rainy this afternoon but last night's wind blew in some new birds. We spent this Morning watching a great falcon show (mostly merlins) at Lobster Cove and finding a few more songbirds.

Highlights:

YELLOW-THROATED WARBLER-bright and beautiful amid a plum bush, presumably the one first found on Saturday by

Blair Nikula. Thanks to Doug Hitchcox for pointing it out!
LARK SPARROW-with two dickcissels, chipping sparrows, a clay-colored sparrow, etc. Behind the school.
Baltimore oriole in full summer male plumage.
Lots more palm warblers, including a brown Western palm.
Not seen by me but also here:
WHITE-EYED VIREO-found by Derek Lovitch near the Ice Pond the morning.
Derek also had a marsh wren and a Canada warbler on the way to Lobster Cove this morning.
Sora in the Meadow.
BLUE GROSBEAK-found by Eric Hynes in the Meadow.
And lots of other stuff despite the weather!
Kristen

SEPTEMBER 30. 2010
Robin Robinson
This morning had a 'Get-Your-Hard-Hat" massive fall out on the leading edge of the storm. mild breeze about 5mph

at the time, overcast and warm. Lasted 45 min, then fog bank rolled in and rain. Birches referenced are off a deck, two of them which seem to catch lots of passerines
Numbers of warbs are conservative. Got lots of pics, always fun! Robin Robinson
http://robins-chaos.blogspot.com

- Show quoted text -
Then, I went to Lobster Cove:
Snowies 2
GHB 1
GLOSSY IBIS!!! 1
Greater Yellow Legs, 1 hanging with above
more Yellow rumps, 5
Flickers 3
Kingfisher 1
Marsh Cove Rd
Wild turkies 3
Wat'ah Lake/Sebasco resort
Canadas 100
Herring gulls
RT Hummer zoomed by
GBH 1
Crazy day!

Robin Robinson

OCTOBER 7, 2010
Now that most of the birders are gone I will resume my posts. They did a much better job of searching the island than I do. Today had a few birds still kicking around, but a lot have moved along.

magnolia warbler - 1
golden-crowned kinglet - numerous
white-throated sparrow - numerous
yellow-rumped warbler - numerous
northern flicker - 2
yellow-bellied sapsucker - 2
red-breasted nuthatch - numerous
red-eyed vireo - 2
black and white warbler - 2
brown creeper - 4
purple finch
baltimore oriole - 1
osprey - 2
merlin - 2
peregrine falcon - 2
ruby-crowned kinglet - 1
black duck - 3
white-crowned sparrow - 2
clay-colored sparrow - 2
common yellowthroat - 1
yellow palm warbler - 2

cheers!
Tom M.

OCTOBER 8, 2010

This morning there were a smattering of interesting birds around. Most noteworthy was a WORM-EATING WARBLER that came into my pishing after viewing a chat briefly. This was just up the hill from the Trailing Yew. I watched it for five minutes or so, then it disappeared back into the brush.

red-bellied woodpecker - 1
yellow-rumped warbler

red-breasted nuthatch - 8
baltimore oriole - 2
ruby-crowned kinglet - 3
northern flicker - 6
golden-crowned kinglet
brown thrasher - 1
osprey - 1
white-throated sparrow
sharp-shinned hawk - 2
winter wren - 1
brown creeper - 2
red-eyed vireo - 4
swamp sparrow - 2
peregrine falcon - 5
black duck - 4
black-throated green warbler - 1
wilson's warbler - 1
yellow-bellied sapsucker - 2
chipping sparrow - 6
white-crowned sparrow - 4
pine siskin - 2
northern gannet
merlin - 2
pine warbler - 2
blackpoll warbler - 2
great blue heron - 1
palm warbler - 2
yellow-breasted chat - 1
WORM-EATING WARBLER - 1

Cheers!
-Tom M.

OCTOBER 8, 2010 #2
Paul Corcoran
Oct 9, 7:43 am
Yesterday I went over to Monhegan Island for the first time. The wind was blowing 15 to 20 mph. I was joined by Jonathan, Ellen and Bryce. We had 49 species by lunch and then added guillemot in the afternoon. We went to Lobster Cove and then continued past the ship wreck to the back side of the island. We were treated to 450+ Northern Gannets they were diving repeatedly.
Paul from Bangor

OCTOBER 16, 2010

There have been some good birds around this week. It seems a lot have left the island with the strong winds. Warblers and vireos are getting scarce. I saw only one red-eyed vireo today. The yellow-rumps are way down, and the blackpolls were almost as numerous. The 14th was a good day all around, as you will see. A few black-throated-blue and green-warblers were seen on the 14th as well as a few common yellowthroats, and northern waterthrush was a surprise. Today I saw my first orange-crowned warbler. Palm warblers were less scarce today. Only yellows were present, the westerns were most abundant on 14th. I heard a chat on the 14th. On the 12th I saw a scarlet tananger. One blue headed vireo on the 13th.

The sparrows were very abundant since the 12th with the 14th seeming to be the peak. Today there were many less white-throats. There was however a nice lark sparrow coming to the seed in Tom's yard. A field sparrow has been seen the last few days. White-crowned sparrows peaked on the 14th with 17 being seen. My first fox sparrow was on the 14th, and a lincoln's was seen on the also.

Pine siskins were in good numbers on the 14th. Three wood ducks were on Ice Pond on the 14th, as well as a mallard/black duck hybrid, which is hanging with black ducks. Baltimore orioles were seen up til the yesterday. Four rusty blackbirds were seen on the 14th. A lone yellow-billed cuckoo was seen on the 14h and I found feathers of a yellow-billed in the same area today, so I fear it has come the way of the hooded warbler. Both kinglets are less numerous and I only turned up one sapsucker today. Great cormorants are picking up though. Peregrines and merlins are still terrorizing the skies.

All and all it is still relatively birdy and the time is here for any wayward vagrant to show. Who will come out find them?

Cheers!
-Tom M.

END