



## **Monitoring of Owls and Nightjars, MOON, in Illinois - 2008 Report**

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### **Summary**

Because anecdotally we know that some species of owls, and possibly all three species of nightjars in Illinois, are declining Monitoring of Owls and Nightjars, MOON, was initiated in 2008. Owls to be monitored during this study were restricted to nocturnal species, because of the time of the study. Therefore, Great Horned Owl, Barred Owl, Eastern Screech-Owl, and Barn Owl were the primary owl species we are monitoring, while Common Nighthawk, Whip-poor-will, and Chuck-will's-widow were the nightjars we are monitoring. Fortunately for us, monitoring programs targeting owls and/or nightjars had already begun in the Northeast (Northeast Coordinated Bird Monitoring Partnership), Wisconsin (Wisconsin Bird Conservation Initiative), Canada (Bird Studies Canada), and the Southeast (U.S. Nightjar Survey Network). This helped us to lay a groundwork protocol so that we would be able to collaborate in the future with these other organizations to try and denote population trends, habitat requirements, and food requirements, and later make sound management decisions to conserve individual species.

Being a first year study we knew our volunteer base would not be too robust to begin with, but we hoped it would pique interests as word got out about MOON. We were able to recruit 27 volunteers to run 23 routes. Volunteers created their own 9 mile long routes with 10 stops along suitable owl and nightjar habitat. Because Illinois is so agriculturally dominated using BBS routes was out of the question, as many of them did not fall within habitat that would be used by owls or nightjars. We have historical evidence, because of programs such as Spring Bird Count, Christmas Bird Count, and Breeding Bird Survey, that indicates where owls or nightjars have been detected in the past. There were three monitoring time frames in 2008, one in May, one in June, and one in July.

Results indicated that of the owl species monitored there were 145 Barred Owls (15 routes), 11 Eastern Screech-Owls (7 routes), and 35 Great Horned Owls (12 routes) detected along routes. Along those same routes nightjars detected were 84 Whip-poor-wills (7 routes), 18 Common Nighthawks (7 routes), and 0 Chuck-will's-widows. Additionally, 3 American Woodcocks (3 routes) were detected. Given this was MOON's pilot year we decided, based on results, to modify the protocol for the second year of the study. Modifications will include incorporating an Eastern Screech-Owl playback at the end of the initial 6 minute listening period at each stop, as well as shifting sampling period times around to try and detect more owls.

## **Background**

Bird monitoring has played a crucial role in estimating population trends, distribution, and abundance for many species, which in turn has been integrated into management and conservation decisions regarding many high profile species. These changes in management, and efforts to conserve, have restored and stabilized many of the once extirpated or nearly extirpated species. However, while current monitoring programs, such as Breeding Bird Survey (BBS), Spring Bird Count (SBC), and Christmas Bird Count (CBC) have done an excellent job of estimating population trends for most species they do not have the capability to estimate population trends for nocturnal species. Because of this void, many organizations throughout Canada and the United States have begun, or are beginning to implement monitoring programs for various groups of nocturnal species. The initiation of efficient and statistically powerful monitoring programs for nocturnal species will allow us to detect small population changes over a shorter period of time.

### Owl and Nightjar Status in Illinois

In Illinois we have four confirmed breeding species of owl; Barn Owl, Barred Owl, Great Horned Owl, and Short-eared Owl and three confirmed breeding species of nightjar; Chuck-will's-widow, Common Nighthawk, and Whip-poor-will. Within these two groups the Barn Owl and the Short-eared Owl are currently listed as endangered, although it is likely others may be listed in the future if we do not have the knowledge to make sound conservation and management efforts.

Because much of Illinois has become agriculturally dominated habitat selection is limited for owls and nightjars. Additionally, changes in agricultural practices have caused a decrease in available food sources for owls and nightjars. Needless to say it became apparent Illinois was in need of a monitoring program that would eventually allow us to learn more about these two groups of species and what courses of action we need to take to see that they are conserved. Henceforth, in the spring of 2008 Monitoring of Owls and Nightjars, MOON, in Illinois was initiated. MOON is a volunteer based program that occurs throughout the state of Illinois. Volunteers monitor routes located along suitable habitat for owls and nightjars. Routes are 9 miles long with 10 stops per route.

## **Methods**

### **Protocol:**

Based on previous research (Northeast Coordinated Bird Monitoring Partnership, Wisconsin Bird Conservation Initiative, Bird Studies Canada, and the U.S. Nightjar Survey Network) we know that there are certain criteria that are important when monitoring for owls and nightjars (Hunt 2007, Gallo 2007). Because of these criteria, we tried to closely follow the standard protocols of those currently undergoing Owl and Nightjar research:

- 1) Each survey should be conducted at least 30 minutes following sunset (when the moon is above the horizon) and end no later than 15 minutes prior to sunrise.

- 2) Surveys should only be completed during times when the moon is 50% or greater illumination. 2008 optimal monitoring dates are May 12-27, June 11-26, and July 10-26.
- 3) Surveys should only be performed when the moon is above the horizon and not obstructed by clouds. Nightjars have been shown to call less frequently when the moon is below the horizon or hidden by cloud cover.

### Counting Owls and Nightjars:

Owls or nightjars seen or heard within the 6 minute listening period were recorded. Monitors were asked to listen, with the same consistency at each stop, for birds from a stationary position outside of their vehicle.

The counting period was broken into 6 1-minute blocks with each individual bird being recorded only once during each 1-minute block if it was detected. This technique will allow us to compare our data with data of others. Volunteers were encouraged to use their best judgment when determining if a bird was moving while listening at a stop.

Data was recorded at the time birds were detected, rather than waiting for the end of the six minute period, to avoid data omission errors.

### \* Other Species:

We encouraged volunteers to record any species they heard calling while monitoring. At some point in the future we hope that this data may become applicable to understanding more about species that call at night.

### Data forms:

Data forms consisted of filling out the route name and number, observer name, date, start time, and end time, as well as detection data at each stop. In conjunction with other surveys already in progress we also collected data on wind speed, sky condition, and noise at each stop. When entering data Alpha codes were used for species names (Appendix A). In addition, route location data was also collected from volunteers, as well as habitat data at each stop.

### Route Selection:

Each route consists of 10 stopping points where monitors stop, get out of their vehicle, and listen for nightjars and owls for a period of 6 minutes. Each stopping point should be at least one mile apart. The starting point of your route will be named stop #1 and so on until you get to stop #10. At this time you will have driven a nine mile route. Note: If needed, it is better to add space rather than shortening space between stops to avoid double counting. Also, given the topography of the state and the layout of many roads we realized that not all routes would be straight nine mile routes. Because of the topology of Illinois (agriculturally dominated) monitors were encouraged to scout and create their own routes along suitable owl and nightjar habitat.

## **Results**

This pilot year was very informative and with 27 volunteers monitoring 23 routes we were provided with enough data to make what we hope will be positive changes for the years to come. Table 1 is a table depicting each of the counties that had detections by period monitored. The Barred Owl was the most frequently detected species (n=145), while the Chuck-will's-widow was not detected at all throughout the 2008 monitoring season. In Figure 1 all counties monitored are shown, along with information on what counties detected birds and what counties did not. We also took the data and used statistical analysis (program MARK) to determine the detection probability of Barred Owl, Great Horned Owl and Whip-poor-will (Figure 2). While the probability of detecting a Barred Owl or Great Horned Owl stayed fairly consistent (~40%) from May – July the probability of detecting a Whip-poor-will decreased greatly in July (~30%) when compared to detection probability in May

and June. We also looked at occupancy estimations (Figure 3) for these same three species and, not surprisingly, when comparing the three species occupancy estimates were highest for the Barred Owl, while the Great Horned Owl and Whip-poor-will followed a similar decreasing occupancy trend from May – July. Non-targeted species that were detected while monitoring can be viewed in Table 2.

## **Discussion**

In Illinois it has been shown that owls and nightjars share much of the same habitat (Spring Bird Count, Christmas Bird Count, and Breeding Bird Survey data). As stated earlier, we combined owls and nightjars for this monitoring program and were able to analyze and make deductions from the data, or lack thereof, that we collected while monitoring for these two groups of birds. In respect to the nightjar data from 2008 it was a bit disconcerting to see that there were no Chuck-will's Widows detected and very few Common Nighthawks both of which normally occur in the state. The Chuck-will's-widow absence could have simply been a result of the lack of routes in areas where they have been detected in the past. Unfortunately this monitoring program, based upon its current protocol and route selection, may not justly serve to detect trends for Common Nighthawks. Areas where Common Nighthawks are more commonly being seen today are in towns and large cities. While we will continue to monitor for this species, it is likely Common Nighthawks may have to be looked at separately from this program and with a different route selection approach. We were able to detect Whip-poor-wills in 7 of the counties that had routes in them. Because this number is only a small representative relative to the size of the state itself we will have to make an increased effort to increase our number of routes monitored in the years to come.

As previously stated, some of our species were not detected at all (Chuck-will's-widow and Barn Owl) or were so rarely detected that we were unable to use data from certain species, such as the Eastern Screech-owl, when analyzing for detection probability and occupancy. If species are declining over time we should see trends in areas where we know these species have been detected in the past. Also, we learned that detection probability changes based on the time of year the monitoring is occurring. Because we had three sampling periods in 2008 we were able to look at detection probabilities by month. It became apparent to us that July did not appear to serve any benefit to us in terms of collecting data for Great Horned Owls and Whip-poor-will. Because other monitoring organizations monitor for owls earlier in the year, such as February, March, or April, we decided to add an April sampling period to the 2009 monitoring year. Our low Eastern Screech-owl numbers (n=11) prompted us to consider using playbacks in 2009. Again, Spring Bird Count and Christmas Bird Count data has shown that there are Eastern Screech-Owls occupying several areas throughout the state. Much of the time these species are detected during these surveys is through the use of a playback call.

In 2009 changes we would like to make are as follows:

1. Include Eastern Screech-Owl broadcast surveys at the end of the six minute passive listening period.
2. Drop the July sampling period and add an April sampling period.
3. Try and increase coverage to encompass other species home range i.e. Chuck-will's-widow.

## **Acknowledgements**

We would like to thank all of the volunteers that used their personal time to help make this first year of MOON a success. Additionally, we would like to thank Northeast Coordinated Bird Monitoring Partnership, Wisconsin Bird Conservation Initiative, Bird Studies Canada, and the U.S. Nightjar Survey Network for starting up such fantastic monitoring programs to serve as excellent references when putting together our own here in Illinois. Finally, to the staff of the IDNR, TNC, and INHS thank-you for all of your input and in some cases your monitoring.

## **Literature Cited**

Breeding Bird Survey – USGS. <http://www.pwrc.usgs.gov/BBS/>

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Hunt, P.D., 2007. Northeast Nightjar Survey: 2007 Summary. Reports to the Nuttall Ornithological Club and Northeast Coordinated Bird Monitoring Program. Audubon Society of New Hampshire, Concord.

Kleen, V.M., L. Cordle, and R.A. Montgomery. 2004. The Illinois Breeding Bird Atlas. Illinois Natural History Survey Special Publication No. 25 xviii + 459pp.

Spring Bird Count Data – Illinois Natural History Survey. <http://www.inhs.uiuc.edu/databases/sbc/about.html>

Wilson, M. D. and B. D. Watts. 2006. Effect of moonlight on detection of Whip-poor-wills: implications for long-term monitoring strategies. *Journal of Field Ornithology* 77:207–211.

Table 1: All counties that detected owls, nightjars, or woodcocks. Counties and dates are located together within the first column.

	AMWO	BDOW	CONI	EASO	EASO (Tape)	GHOW	WPWI	Total
Bond3565-51908		4	2	2			6	14
Bond3565-61708		2	1				18	21
Bond3565-72008		8	1			3	2	14
Cal2524-61808						1		1
Cal2524-71808	1		3					4
Cal7447-61408		7					4	11
Cal7824-71608				2				2
Champ4158-72208			1					1
Coles6476-52508		6		3		2	5	16
Coles6476-61808		2		1			2	5
Cook4308-70408			2			1		3
Cook4308-72508			1					1
Cumb6476-51208		3				1	1	5
Edwa0476-51608		2				3	1	6
Edwa0476-61408		2				1		3
Hanc6397-52008		1				1		2
Hanc6397-61508		1						1
Jasp2685-52108		17					5	22
Jasp2685-61608							10	10
JoDa3053-52108		11	2	1		7	22	43
JoDa3053-62308		12				3	5	20
JoDa3053-72208		12				4	3	19
Lake2929-72808					2			2
Lawr2880-52108		2				2		4
Lawr2880-61708		2				1		3
Lawr2880-71908				1				1
Livin1313-60808						1		1
Livin1313-72208		1						1
Log4684-62008			3					3
Log4684-72608	1	1	1					3
Piat7824-62308		8	1					9
Piat7824-72408		13						13
Union2515-52308		4						4
Verm8955-62708	1							1
Whit0157-62108		7				1		8
Wood2828-52108		9				1		10
Wood2828-61608		3		1		2		6
Wood2828-71608		5						5
Grand Total	3	145	18	11	2	35	84	298

Table 2: Throughout the study many volunteers recorded non-targeted species. Additional species can be viewed in the table below. You can note that many of the same species were detected along different routes:

<b>Species</b>	<b>Route</b>	<b>Date</b>	<b># Detected</b>
EATO	JoDa3053	5/21/08	2
FISP	JoDa3053	5/21/08	1
GRSP	JoDa3053	5/21/08	3
HESP	JoDa3053	5/21/08	6
MODO	JoDa3053	5/21/08	1
WEME	JoDa3053	5/21/08	1
YBCU	JoDa3053	5/21/08	1
CAGO	JoDa3053	6/23/08	1
CHSP	JoDa3053	6/23/08	1
FISP	JoDa3053	6/23/08	3
GRHE	JoDa3053	6/23/08	1
GRSP	JoDa3053	6/23/08	3
HESP	JoDa3053	6/23/08	12
SOSP	JoDa3053	6/23/08	1
WEME	JoDa3053	6/23/08	1
YBCU	JoDa3053	6/23/08	4
DICK	JoDa3053	7/22/08	1
FISP	JoDa3053	7/22/08	1
GBHE	JoDa3053	7/22/08	1
GRHE	JoDa3053	7/22/08	1
GRSP	JoDa3053	7/22/08	1
HESP	JoDa3053	7/22/08	10
WITU	JoDa3053	7/22/08	5
HESP	Piat7824	6/23/08	5
GRSP	Piat7824	7/24/08	3
HESP	Piat7824	7/24/08	5
SEWR	Piat7824	7/24/08	4
KILL	Whit0157	6/21/08	1
SEWR	Whit0157	6/21/08	1
SOSP	Whit0157	6/21/08	1
<b>TOTAL</b>			<b>82</b>

# MOON Counties Monitored 2008

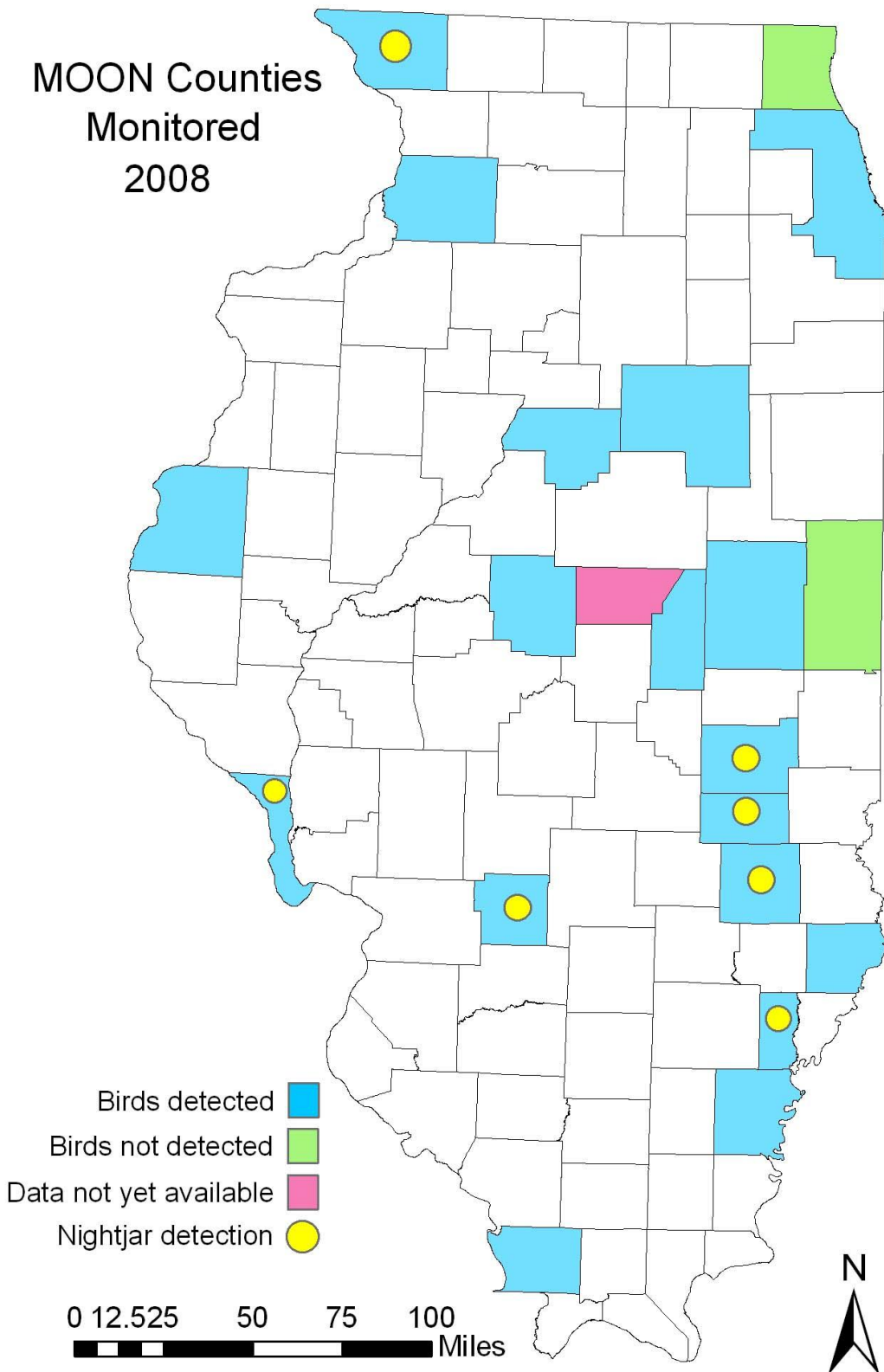


Figure 1: MOON counties monitored in Illinois in 2008.



Figure 2: Detection probability for Barred Owl, Great Horned Owl, and Whip-poor-will.

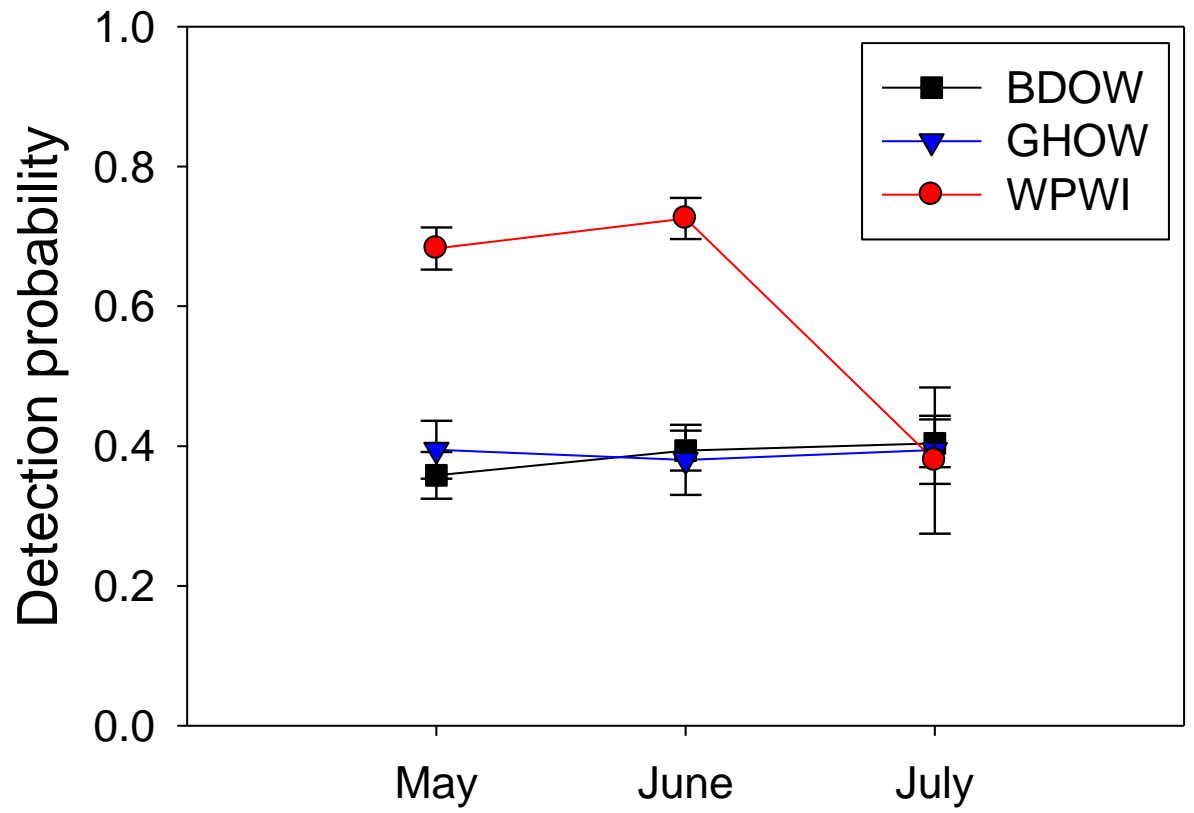
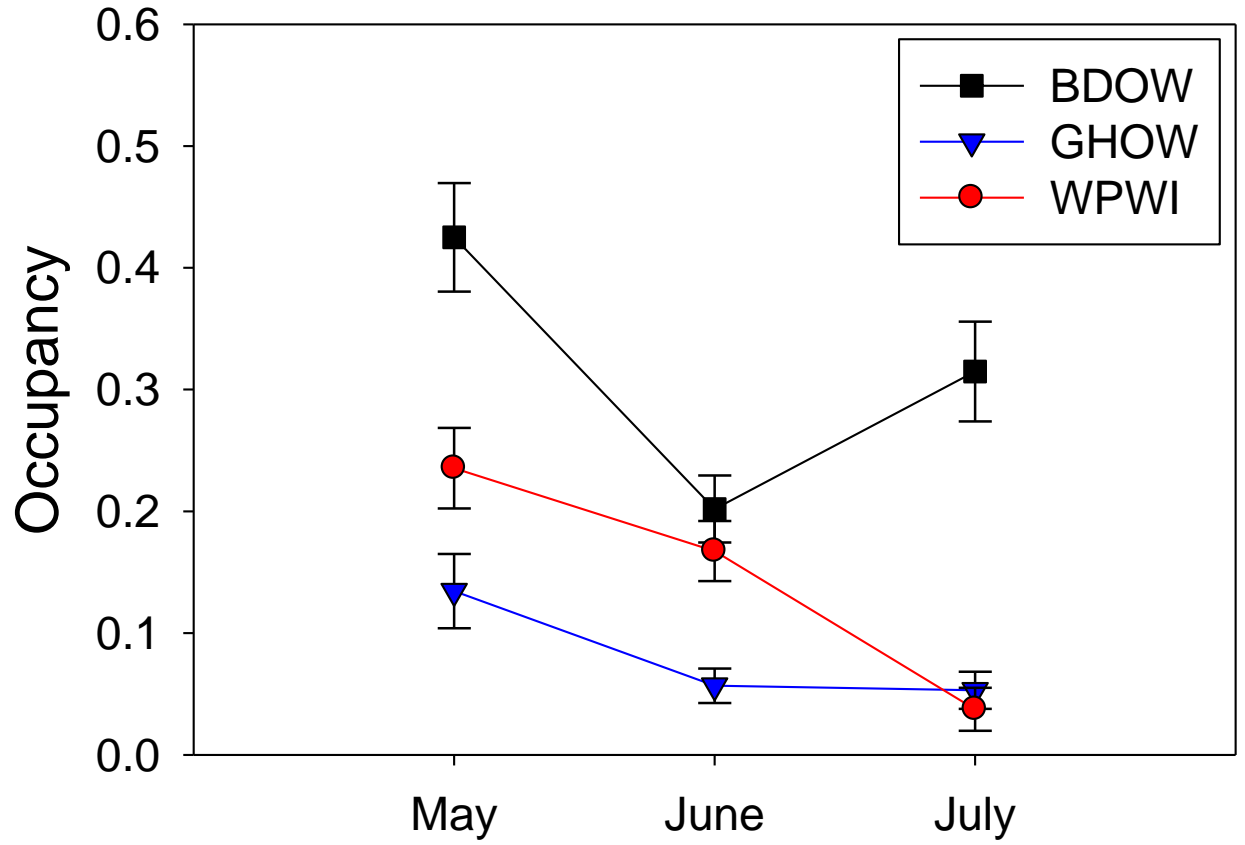


Figure 3: Occupancy estimation for Barred Owl, Great Horned Owl, and Whip-poor-will.



## APPENDIX A

### MOON 2008 Monitoring Instructions

Based on previous research we know that there are certain criteria that are important when monitoring for owls and nightjars. The following are a list of these criteria:

- 1) Each survey should be conducted at least 30 minutes following sunset (when the moon is above the horizon) and end no later than 15 minutes prior to sunrise.
- 2) Surveys should only be completed during times when the moon is 50% or greater illumination. 2008 optimal monitoring dates are May 12-27, June 11-26, and July 10-26. Monitoring should only be performed when the moon is above the horizon and not obstructed by clouds. Nightjars call less frequently when the moon is below the horizon or hidden by cloud cover.

#### **\*Route Selection:**

Each route should consist of 10 stopping points where you stop, get out of your vehicle, and listen for nightjars and owls for a period of **6** minutes. Each stopping point should be at least one mile apart. The starting point of your route will be named stop #1 and so on until you get to stop #10. At this time you will have driven a nine mile route. Note: If needed, it is better to add space rather than shortening space between stops to avoid double counting. Also, given the topography of the state and the layout of many roads we realize that some will have to turn down different roads to complete their routes. **Scouting your route is always a good idea.** This year we have added an additional **46 randomly selected routes** within forested habitats. Location data for these routes will be provided if selected.

**\* Other Species:** We are encouraging volunteers to record any species they hear calling while monitoring. If you are not sure of the call than do not record anything, but, for instance, if you know the call is a Sedge Wren or a Henslow's Sparrow, please record the species in the same format that you would the owls or nightjars.

\*The following items can be found either by following the appropriate data form link or can be mailed to you upon request:

1. Owl and Nightjar data collection sheet
2. Owl and Nightjar route description sheet (not necessary to fill out if you are completing the same route and have already filled on out before)
3. Playback instructions and Playback test on the back of the stops description sheet
4. CD
5. Placard (this is to place in your car window)

**\*When completing the data forms:** (Many of these criteria are in conjunction with the Northeast Nightjar Survey Network, current research from the Center for Conservation Biology at the college of William and Mary, Wisconsin Bird Conservation Initiative, and Bird Studies of Canada)

- 1)**Route name and number-** All pre-existing routes are named and numbered from the previous year. New randomly chosen routes are now available. We currently have 45 new routes to cover within the state (e.g., Champaign7824).
- 2) **Observer-** Record your name here
- 3) **Date** – This is the date you are surveying
- 4) **Time Start** – The time you begin listening at your first stop (Stop #1)
- 5) **Time End** – The time you stop listening at Stop #10

**Instructions continue on back side**

Wind: Do not conduct surveys during strong winds. High winds diminish your ability to hear Nightjars or Owls.

Code	Wind Speed	Description
0	Calm (<1 mph)	smoke rises vertically
1	Light (1-7 mph)	smoke drifts, weather vane inactive, leaves rustle, light air movement
2	Moderate (8-18 mph)	leaves, twigs, and thin branches move around, small flags extend, raises loose papers.
3	Strong (19 mph or greater)	small trees begin to sway. <b>Should not conduct survey.</b>

Sky Condition: Do not begin a survey if the sky is completely overcast, during heavy fog, or persistent rain. All of these conditions will diminish calling rates of Nightjars and hamper your survey.

Code	Sky	Description
0	Clear	Cloudless sky, can stars and moon clearly
1	Mostly Clear	Few clouds, less than 25% cloud cover
2	Mostly Cloudy	Many clouds, 25-50% cloud cover
3	Overcast	Dense cloud cover, entire sky covered. <b>Should not conduct survey.</b>

Background Noise: Codes indicate the level of background noise that impairs your ability to hear Nightjars.

Code		Description
0	None	There is no effect of background noise on your ability to hear nightjars
1	Slight	Noise slightly affects your ability to hear nightjars (e.g. distant traffic, 1-2 car passing during a stop's counting period).
2	Medium	Noise moderately affects your ability to hear nightjars (e.g. nearby traffic, 3-6 cars passing during survey period, airplane flying overhead).
3	Excessive	Noise seriously affects your ability to hear nightjars (e.g. continuous traffic nearby, construction noise, frog chorus)

Mile: Enter odometer/tripometer to nearest tenth mile at each stop. Begin with a value of 0 for first stop.

### Counting Owls and Nightjars:

**Only** count owls or nightjars seen or heard within the **6 minute** period you are monitoring for. Monitoring should be done from a stationary position outside of your automobile. Most importantly, be consistent. Use the same technique at each stop including how you focus your listening for nearby birds and distant birds.

The counting period is broken into **6 1-minute listening periods on the data sheet**. Record the detection history of each individual seen or heard from the time of their first detection through their last detection in the appropriate 1-minute block of the data sheet (each individual will have their own line on the data sheet). Use a value of 1 for a detection and if there is not detection the minute column can be left blank. This technique will allow us to compare your data to studies that use different time periods. Birds will sometimes move during the counting period. Use your best judgment in distinguish new detections from those of birds that have moved during the count.

**Because** we want to be consistent with our data collecting, playbacks should not be played until the 6 minute period is over. Also, **DO NOT** use alternate mechanisms to look for birds, such as flashlights. These practices will bias your survey and make it difficult to compare your data to the data of others. Record birds as you hear them, rather than waiting for the end of the six minute period to avoid data omission errors.

Enter a Stop# in the appropriate column of your data sheet beginning with #1 for your first stop and sequentially numbering others as 2 through 10.

Please use species alpha codes when recording data:

WPWI = Whip-poor-will	BDOW = Barred Owl	BNOW = Barn Owl
CWWI = Chuck-will's-widow	GHOW = Great Horned Owl	*AMWO = American Woodcock
CONI = Common Nighthawk	EASO = Eastern Screech-Owl	**other species

\*If you detect this species please record it as you would an owl or a nightjar.

\*\*If you detect another species that is not a target species and you can correctly identify it please record it.

--If none of these species are detected at a stop enter **NONE** in the species column on the data sheet on the same line as that stop number.

--Try your best to maintain a detection history of each individual over all six minutes

**Sample Data Entry for an observer at 4 stops: Each line represents an individual bird's detection history and a value of 1 indicates that an individual bird was heard during that respective minute. Use a new line for each new bird detected at a stop.**

Stop#	Species	Time blocks (minutes of survey)					
		1	2	3	4	5	6
1	EASO						
1	CWWI			1	1	1	1
1	CWWI;	1	1	1			
2	NONE						
3	WHIP	1	1	1			
3	WHIP		1	1	1	1	1
4	EASO						
4	CONI				1		1

Wind: Do not conduct surveys during strong winds. High winds diminish your ability to hear Nightjars or Owls.

Code	Wind Speed	Description
0	Calm (<1 mph)	smoke rises vertically
1	Light (1-7 mph)	smoke drifts, weather vane inactive, leaves rustle, light air movement
2	Moderate (8-18 mph)	leaves, twigs, and thin branches move around, small flags extend, raises loose papers.
3	Strong (19 mph or greater)	small trees begin to sway. <b>Should not conduct survey.</b>

Sky Condition: Do not begin a survey if the sky is completely overcast, during heavy fog, or persistent rain. All of these conditions will diminish calling rates of Nightjars and hamper your survey.

Code	Sky	Description
0	Clear	Cloudless sky, can stars and moon clearly
1	Mostly Clear	Few clouds, less than 25% cloud cover
2	Mostly Cloudy	Many clouds, 25-50% cloud cover
3	Overcast	Dense cloud cover, entire sky covered. <b>Should not conduct survey.</b>

Background Noise: Codes indicate the level of background noise that impairs your ability to hear Nightjars.

Code		Description
0	None	There is no effect of background noise on your ability to hear nightjars
1	Slight	Noise slightly affects your ability to hear nightjars (e.g. distant traffic, 1-2 car passing during a stop's counting period).
2	Medium	Noise moderately affects your ability to hear nightjars (e.g. nearby traffic, 3-6 cars passing during survey period, airplane flying overhead).
3	Excessive	Noise seriously affects your ability to hear nightjars (e.g. continuous traffic nearby, construction noise, frog chorus)

Mile: Enter odometer/tripometer to nearest tenth mile at each stop. Begin with a value of 0 for first stop.

# Owl and Nightjar Survey Data Sheet

CONTINUED ON BACK OF FORM

Observer Name:				County:													
Date:						Route Name & Number:											
Street Address:										City, State, Zip Code:							
Start time:				End time:						Observer email:							
Survey conditions at each stop: (fill below)				Estimated Temp:						Wind Codes		Sky Codes		Noise Codes			
Stop#:	1	2	3	4	5	6	7	8	9	10	0 = none		0 = clear		0 = none		
Wind											1 = slight		1 = mostly clear		1 = slight		
Sky											2 = moderate		2 = mostly cloudy		2 = medium		
Noise											3 = strong		3 = overcast		3 = excessive		
Mile	0.0																

		Time Blocks (Minutes of Survey)					
Stop #	Species	Minute 1	Minute 2	Minute 3	Minute 4	Minute 5	Minute 6

Mail this form to: Tara Beveroth, Illinois Natural History Survey, 1816 S. Oak St., Champaign, IL 61820





## Owl and Nightjar Stops Description Data

Use this form if you are creating your own route, if you are using a pre-existing route this form will not be necessary.

Observer Name	
State	
County	
Route Name and Number	
Year of Survey	

Stop#	Latitude e.g., dec degrees 38.43567 or deg, min, sec 38° 56' 07''	Longitude e.g., dec degrees 71.45465 or deg, min, sec 71° 25' 39''	or Location Description (please include road, or street numbers, and intersections if applicable)	# Houses Visible	Dominant 3 habitats (use codes below)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Habitat Codes:

PF = Pine/Conifer/Mixed Forest  
HF = Hardwood Forest

D = Developed (urban, residential area)  
O = Open (grassland, fields, lawn, clear-cut)

W = Water  
M = Marsh/Wetland

