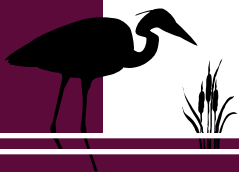


MONITORING OF OWLS AND NIGHTJARS REPORT



Juvenile Eastern Screech Owl, Photo by Michael Avara



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INTRODUCTION

In the spring of 2008 Monitoring of Owls and Nightjars, MOON was initiated to address the need for quality long term data to better understand trends of nocturnal bird populations. MOON is a volunteer-based program that occurs throughout the state of Illinois, and--more recently--a few counties in Iowa. Protocol for the surveys was developed based on that of previous research conducted throughout the U.S. and Canada and in collaboration with a number of partner organizations throughout the Midwest and northeast. Volunteers monitor routes that are located along suitable habitat for owls and nightjars anywhere from late-April to mid-June. Most routes are 9 miles long with 10 stops per route. In areas that are greatly developed, a 10-stop route is not always possible, and the route is abbreviated. Primary species that are monitored include Great Horned Owl, Barred Owl, Eastern Screech Owl, Barn Owl, Eastern Whip-poor-will, Chuck-will's-widow, and Common Nighthawk. Other species that are sometimes recorded include Northern Saw-whet Owl, Short-eared Owl, and American Woodcock.

Owl species monitored through MOON vary significantly in occurrence. Barn Owl is currently listed as threatened in Illinois and the Short-eared Owl is currently listed as endangered. The Northern Saw-whet Owl is found primarily in the very northern part of the state, which is considered the southern limit of its breeding range. Eastern Screech Owls, Barred Owls, and Great Horned Owls have wide



Juvenile Eastern Whip-poor-will, Photo by Grant Witynski

spread distributions across the state, and Barred Owls in particular have gone from historically being considered rare to being the most commonly observed owl across the state.

With regard to nightjars, the Eastern Whip-poor-will and Common Nighthawk occur throughout Illinois and Iowa, while Chuck-will's-widow is found primarily in the southern half of Illinois. In the 1934 publication "Birds of the Chicago Region," Ford et al. considered Whip-poor-wills as "A fairly common summer resident. Although not so numerous as formerly, they still occur throughout the area". Nightjars are in steep decline throughout their range to the point that Chuck-will's-widow is already listed as threatened in Illinois. Loss of habitat, and food availability are suspected to be the main reasons for the decline of this group of birds.

Why volunteer for a MOON route?

If you are a bird lover and nocturnal person by nature, or even an early riser, MOON might be a fun volunteer opportunity for you! The calls are few and easy to learn and the protocol is relatively easy to understand and follow. You can be part of the important data collection process that provides population trend information across time and space—something many other bird surveys do not do for these species. Data is used for habitat modeling to inform best management practices for owl and nightjar conservation—especially for species in decline. For those up for an added challenge, we encourage observations of other birds that call in the night (Grasshopper Sparrow, Henslow Sparrow, Yellow-billed Cuckoo, etc.). This additional data provides insight into the life histories of these species. We are always looking to recruit more volunteers, so if you would like to volunteer for a vacant route please contact beveroth@illinois.edu (Figure 1 and 2).

MOON Highlights since 2008

- ▷ A grand total of 5,784 birds of 7 owl and 3 nightjar species have been detected along 82 routes.
- ▷ 42% of the total individuals detected since 2008 have been Barred Owl. They have

been detected on 69 of the routes.

- ▷ Eastern Whip-poor-will detections to date total 2,029 along 49 routes.
- ▷ County with the greatest # of Eastern Whip-poor-will in 2022 on a single route run: Illinois, Pope (37); Iowa, Ringgold (20)
- ▷ Routes with 10 or more years of data: Cass1235 (13), Edwards0476 (15), Jasper2685 (12), Marion6245 (10), McLean (14), Morgan7212 (11), Piatt7824 (11), Pope2079 (11), and Woodford2828 (15).
- ▷ Barred Owl is the most common species detected. It was found at 69 of the 84 routes monitored since the program began.

METHODS

*Monitoring Times

Routes are surveyed twice each year. These surveys 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.

Surveys are completed during times when the moon is 50% or greater illumination. 2023 monitoring windows will be April 28 - May 12 and May 28 - June 10. Monitors are asked to monitor one time/window. Weather should be considered when deciding which day to monitor during the open windows. It is recommended that monitoring be performed when the moon is above the horizon and not obstructed by clouds. Nightjars in particular call less frequently when the moon is below the horizon or hidden by cloud cover.

*Route Selection

The majority of MOON routes were randomly selected based on forest habitat available in the state. However, there are some routes that have been formed, or altered by volunteers, due to proximity to noisy urban areas or increased noise or activity at a stop. Most routes consist of 10 points where volunteers stop, get out of their vehicle, and listen for nightjars and owls. Each point should be at least one mile apart. Given the topography of the state, and the layout of



Barn Owl, Photo by Travis DeNeal.

many roads, routes may differ greatly in appearance. Volunteers are encouraged to scout their routes ahead of time. Survey route locations and availability can be viewed in Figure 1 and 2.

*Monitoring

Monitoring should be done from a stationary position outside of one's vehicle. Most importantly, monitoring should be consistent. The same technique should be used at each stop including how volunteers focus for listening for nearby birds and distant birds.

Stop number and time should be recorded at the beginning of each stop. Species detected are recorded using a four-letter alpha code (Appendix A). Listening period may vary depending on whether or not playback (optional prerecorded bird call/song) is used. A passive listening period of six minutes should be completed at each stop. The detection history of each individual seen or heard from the time of their first detection through their last detection should be recorded in the appropriate one-minute block of the data sheet (each individual bird detected will have their own row on the data sheet, Appendix B). A value of 1 is used

if there is a detection, and if there is not a detection the minute column can be left blank. Even if an individual calls more than one time during a one minute block it is still only recorded as a 1 for that block. Birds will sometimes move during the counting period. Volunteers are asked to use their best judgement to distinguish new individuals from those individuals already detected.

If unsure if a different individual is calling, a new individual should not be recorded.

If there are no birds detected at a stop NONE should be entered in the species column on the data sheet on the same line as that stop number.

If a volunteer does not use playback they only need to listen at each stop for 6 minutes.

If a volunteer chooses to use playback they will play two prerecorded calls at the end of the initial 6 minute block. A two-minute listening period will follow each of the species calls. The first call will be an Eastern Screech-Owl call for (20 seconds). Following the Screech owl playback listening period a Barn Owl call (20 seconds) will be played. Listen passively for an additional 2 minutes following this playback.

Birds should be recorded as they are heard, and not at the end of the listening periods.

Other Species: Volunteers are encouraged to record other species they hear calling while monitoring. If something is heard, but the volunteer is unsure of the identification, nothing should be recorded. But, for instance, if the call is identified, such as a Sedge Wren, or a Henslow's Sparrow, the species is recorded in the same format as a target species.

RESULTS

From 2008-2022 80 MOON routes have been monitored in Illinois. Over that time 4647 owls, nightjars, and American woodcock have been detected in Illinois (Table 1). In 2016 we also started receiving data from 4 Iowa routes and to date 1137 owls, nightjars, and American Woodcock have been detected (Table 2). Figure 1 shows route occupancy rate by year for each species.

MOON Trends

There are a few routes that have been monitored

nearly every year since 2008, or shortly thereafter (Figure 3). Consistently monitored routes provide us with valuable information as they help us to determine population trends of owls and nightjars. Given that populations fluctuate from year to year having multiple years of consistent data allows us to not only help to establish the conservation status of a species, but also to determine if management is needed. Figure 4 shows the average number of Eastern Whip-poor-will detected by year on select routes that have had multiple Eastern Whip-poor-will detections over the years.

Species Distributions

It is important to monitor species distribution as it can help in predicting how future landscape changes can affect a species. Changes in distribution may be a result of climate change, or other disturbances that are limiting or disrupting the species. Figure 5 illustrates the distribution of Eastern Whip-poor-wills according to MOON data. Data are based on routes that have had at least three survey years of Eastern Whip-poor-will detections. So while 49 of the 80 Illinois routes have had Eastern Whip-poor-will detections few have detected them multiple years. Figure 6 highlights Chuck-will's-Widow detections on MOON routes in Illinois. They have been detected on 7 MOON routes in Illinois and 2 in Iowa. This species is historically found only in southern Illinois and our data shows that they are still found in southern Illinois despite their decline in abundance. Similarly they have also still been detected in southern Iowa.

MOON Species Occupancy

Figure 7 illustrates the occupancy rate of owl and nightjar species by year. Occupancy rate is based on the proportion of routes where a species is found. Barred Owls are found on the majority of the routes nearly every year.

Other species

We continue to collect data on other species that while not the primary focus of MOON may still provide some useful information. Some of these species are detected because they are calling at dusk or dawn, but others are known to actively vocalize at night. To date 68 other species have been detected. One interesting species is the American Woodcock. To date monitors have detected 138 American Woodcock on 27 routes. While this species is of low conservation concern it has declined since 1966

according to Breeding Bird Survey data. They are still a hunted species, so it is important to monitor their populations. They have also suffered from habitat loss as well as pesticide use, and other contaminants due to their foraging behavior. Other interesting species detected on MOON routes are as follows (# of routes in parantheses): Black-billed Cuckoo (2), Yellow-billed Cuckoo (28), Least Bittern (1), Great Blue Heron (19), Grasshopper Sparrow (9), Field Sparrow (22), Henslow's Sparrow (12), Vesper Sparrow (6), and Yellow-breasted Chat (28).

CONCLUSION

While we still seek to fill route voids and consistently monitor previously monitored routes, we have gathered a large dataset at this point. The data collected provides useful information on not only the presence/absence of nightjars and owls in Illinois and parts of Iowa, but also on their distribution and abundance. While consistently run routes provide valuable information it is important to note that all data collected is useful. While it is especially important to continue to monitor species of concern, changes in trends of common species can too be cause for concern.

Owls

Most of our resident owl species are still considered common across their range, although there is a concern that Eastern Screech-owls may be in decline based on MOON data thus far. We seek to understand if this is a result of habitat loss, interspecific competition, a shift in their habitat preferences, or a combination of these factors. One hypothesis could be that they are seeking more forested urban areas. This could be due to competition pressure from other species or loss of nesting habitat due to lack of natural cavities. Because studying this would be informative, placing more focus on monitoring urban areas for these birds may be needed in the future to understand the changes in their distribution and abundance. Barred Owls have increased over the last 100 plus years in Illinois based on numerous datasets including MOON data. While an entertaining species to observe they are known to be an aggressive species when it comes to inter-specific competition. More research is needed to understand their interactions with other owl species in the Midwest. Barn Owl is one owl species that has declined greatly in Illinois due to lost of habitat. However, the Illinois Barn Owl Recovery Plan has benefited the speices and they are now being

detected throughout the the state. While detections are still rare on MOON surveys they are increasing.

Nightjars

We know nightjars are in decline across their range primarily because of habitat loss and food availability. In Eastern North America Eastern Whip-poor-wills have declined 69% since 1970. Undertanding their ecology especially habitat characteristics and feeding has become especially important. Invasive plant speices have negatively impacted our forests resulting in a loss of biodiversity as well as foraging habitat and food for insectivores. Pesticide use also negatively impacts insect diversity and biomass and given many of these insectivores will forage in open areas often impacted by pesticide use you have less food on the landscape. Fortunately, there are many ongoing research projects studying nightjar ecology including migration behavior and stopover site selection. Continuing to monitor their populations provides valuable information for not only their population trends, but also range shifts that could be occurring as a direct result of climate change and habitat loss. Also, habitats that are favorable to nightjars should be conserved and managed appropriately. In Illinois and Iowa we have a few routes where Eastern Whip-poor-wills continue to be found in greater abundance. Often these areas are owned by public entities that manage the habitat using a variety of management techniques including a fire regime. In Illinois these areas are often a mix of sandy soils and oak savannas or large continuous tracts of open understory forest. These habitats may be critical for nightjars and should thus be protected.

ACKNOWLEDGEMENTS

We would like to thank the many volunteers that have helped with MOON over the years and those that continue to do so. This program would not be possible without their time and effort. We would also like to thank the Illinois Department of Natural Resources, Illinois Audubon, local Audubon chapters, the Iowa Department of Natural Resources, and the many MOON partner organizations.



Tara Beveroth with Barred Owl, Photo by Mike Avara

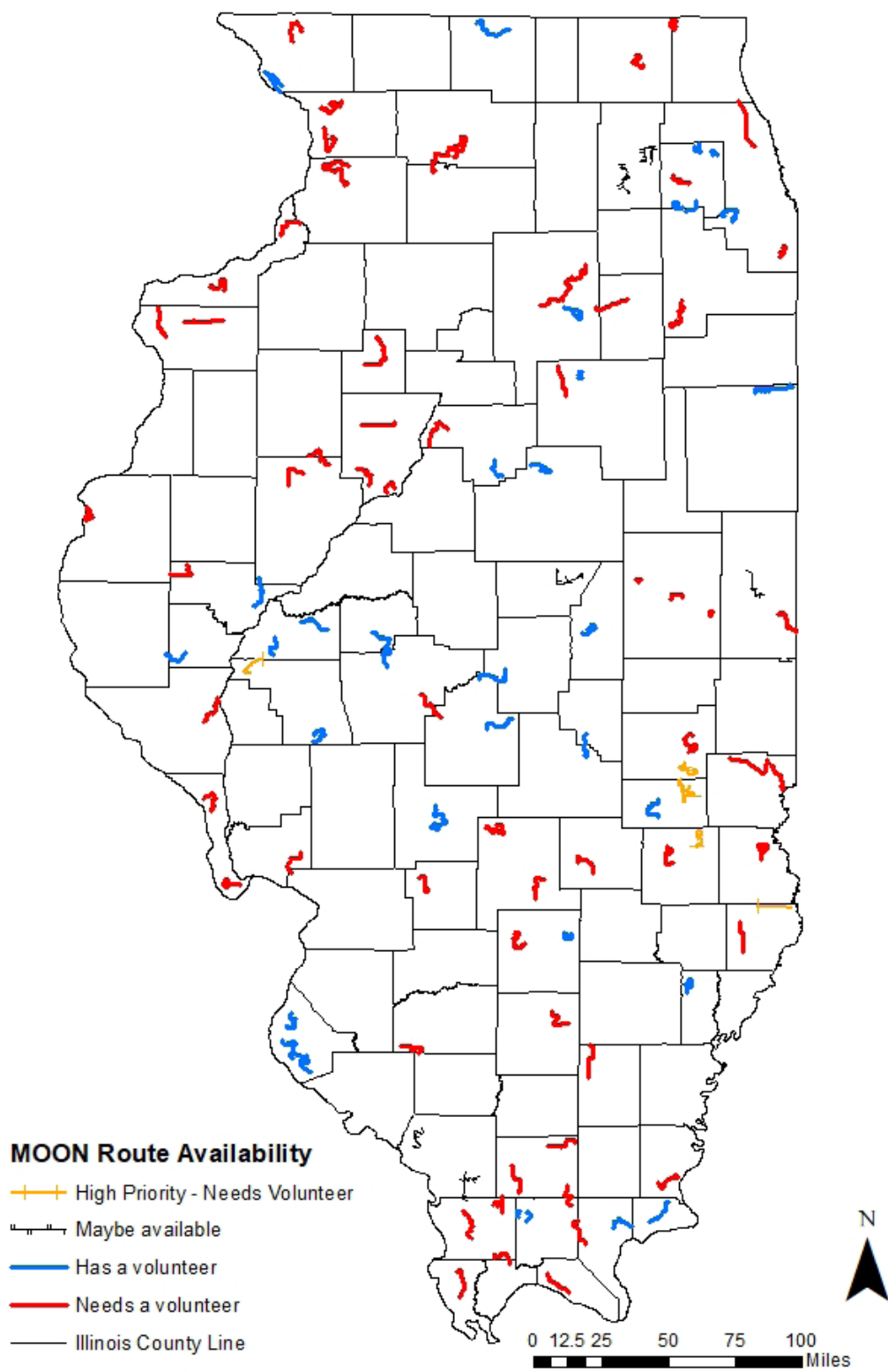


Figure 1. Illinois MOON routes and route availability.

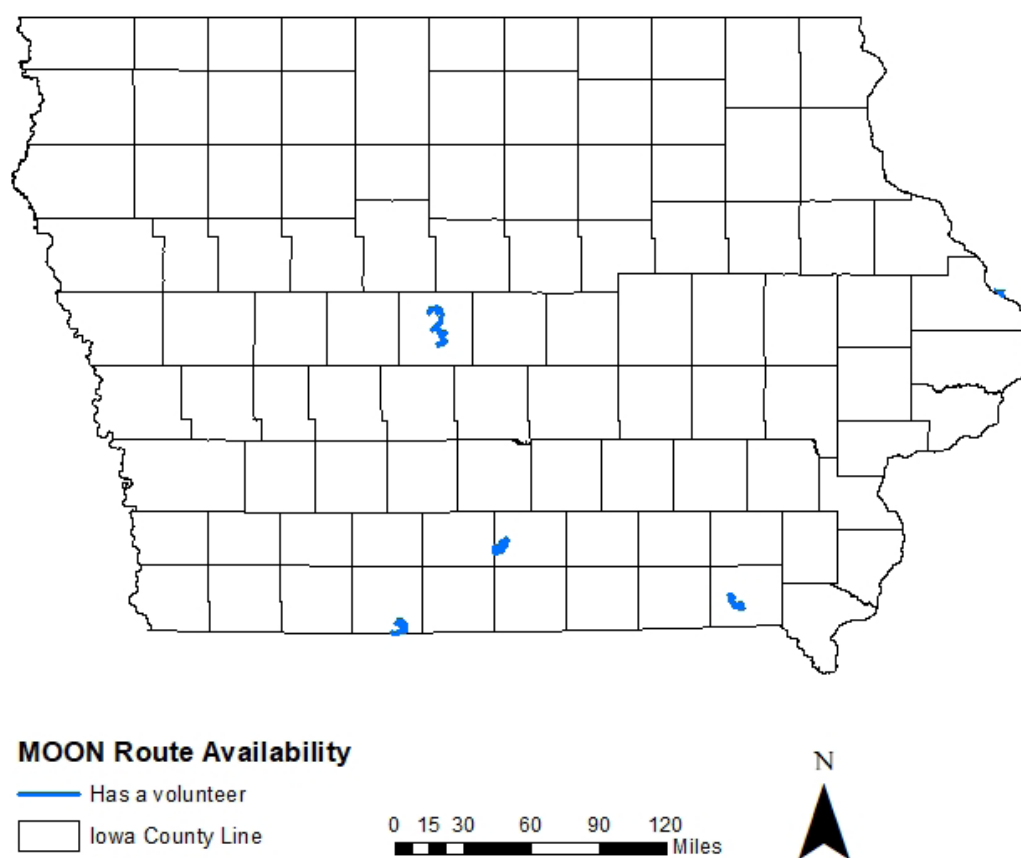


Figure 2. Iowa MOON routes and route availability.

Table 1: Owl, nightjar, and American woodcock detections by year during MOON in Illinois.

YEAR	AMWO	BDOW	BNOW	CONI	CWWI	EASO	EWPW	GHOW	LEOW	NSWO	SEOW
2008	3	144		18		13	84	35			
2009	31	192		19	26	47	135	62		2	
2010	22	232		19	6	52	156	37			
2011	4	114		9		17	77	22			
2012		140		10	7	16	112	30			
2013	9	159		4	25	10	82	33			
2014	14	110		8	13	14	84	12			
2015	9	54	2	12	12	4	99	20	1		
2016	3	111	1	11	11	7	76	35		1	
2017	4	137		2	19	12	63	24			4
2018	3	111		2	8	9	48	12			1
2019	4	144	2	3	22	14	67	24			2
2020	6	186	2	3	11	22	52	24			3
2021	16	118		18	15	14	86	32		1	
2022	10	98	1	27	15	13	164	30			
TOTAL	138	2050	8	165	190	264	1385	432	1	4	10

Table 2: Owl, nightjar, and American Woodcock detections during MOON years in Iowa.

YEAR	AMWO	BDOW	BNOW	CONI	CWWI	EASO	EWPW	GHOW	NONE
2016	3	43	1			15	3	78	6
2017	1	60	2			5	2	80	3
2018		30	1	1		4	2	83	3
2019	1	58	2	1		12	5	123	4
2020	2	69	1			21	3	146	6
2021	4	48				3	4	53	4
2022		52	1			3	3	81	1
TOTAL	11	360	8	2	63	22	644	27	0

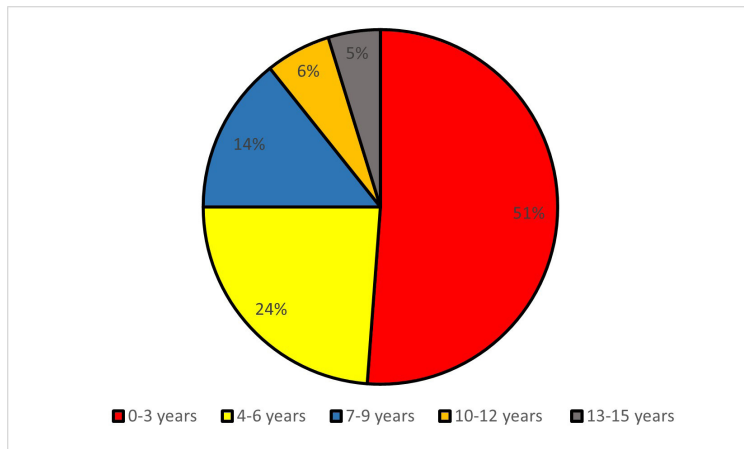


Figure 3. The number of years individual routes have been monitored over 15 years of MOON surveys in three year increments.

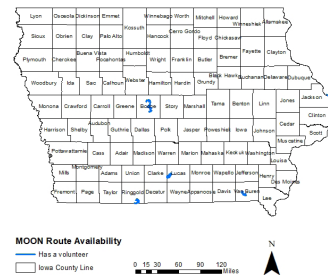
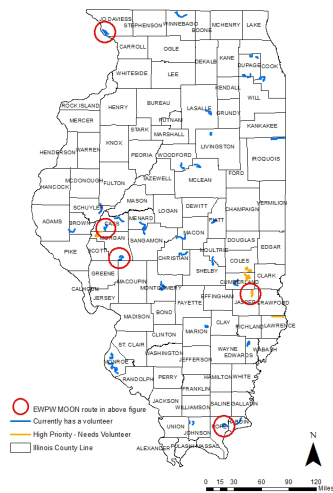


Figure 4. Routes that have had Eastern Whip-poor-will detections at least five or more years since the start of MOON. Illinois and Iowa maps are for location reference.

Illinois Landcover Map using NASS

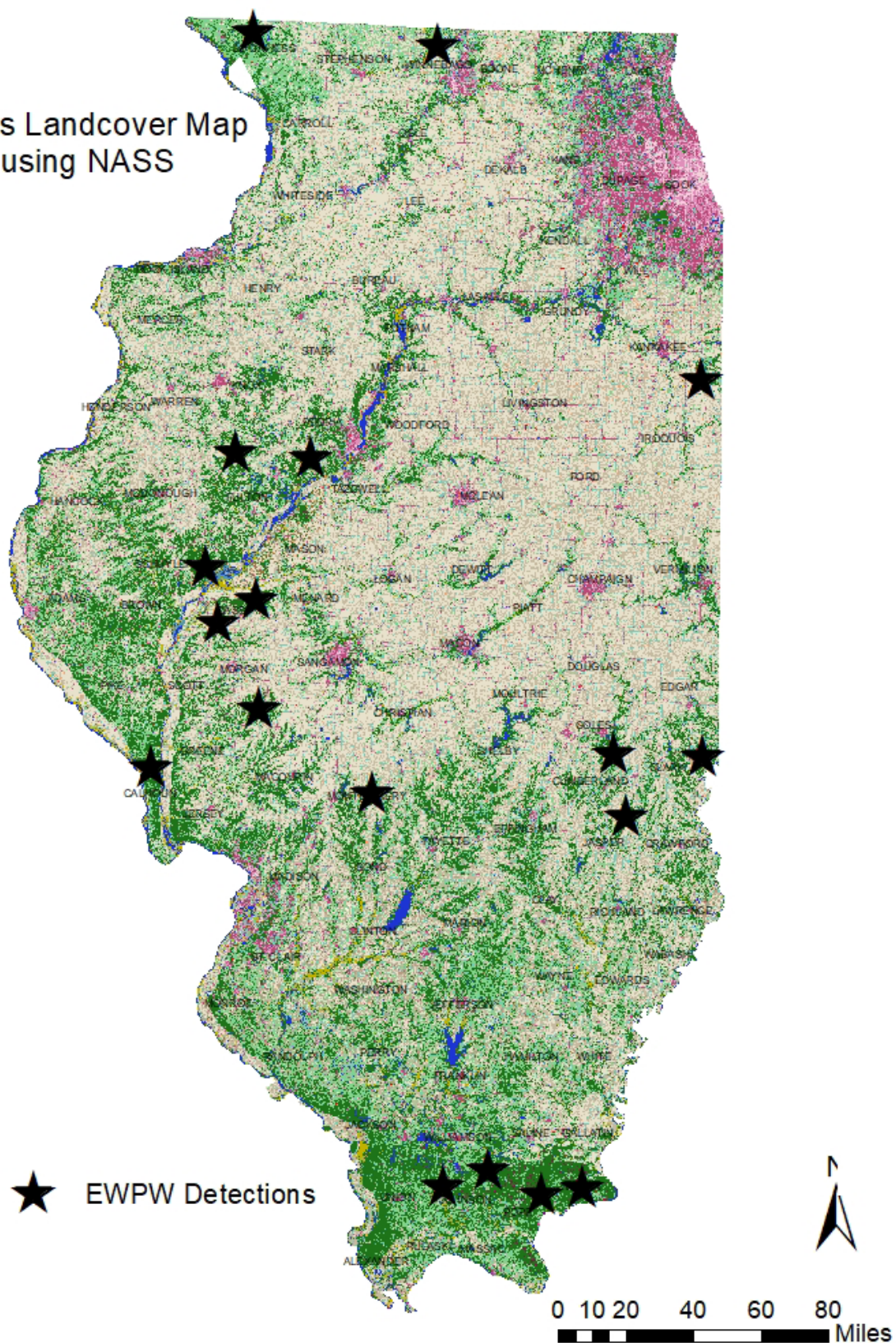


Figure 5. Eastern Whip-poor-will distribution in Illinois based on MOON data. A star indicates a route where an Eastern Whip-poor-will has been detected three or more years. Landscape Source: USDA-NASS

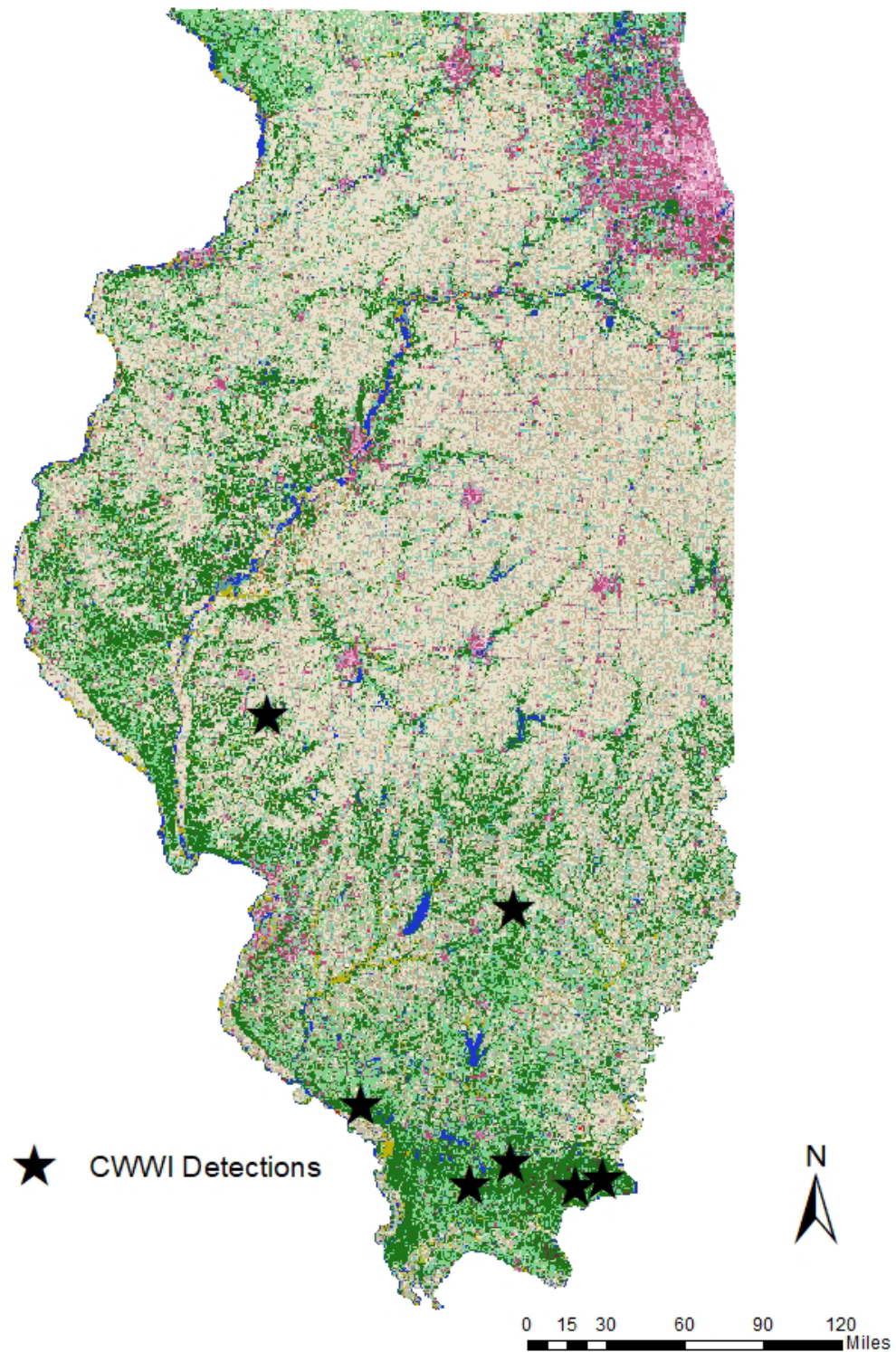


Figure 6. Chuck-will's-widow distribution in Illinois based on MOON data. A star indicates a route where a Chuck-will's-widow has been detected. Landscape Source: USDA-NASS

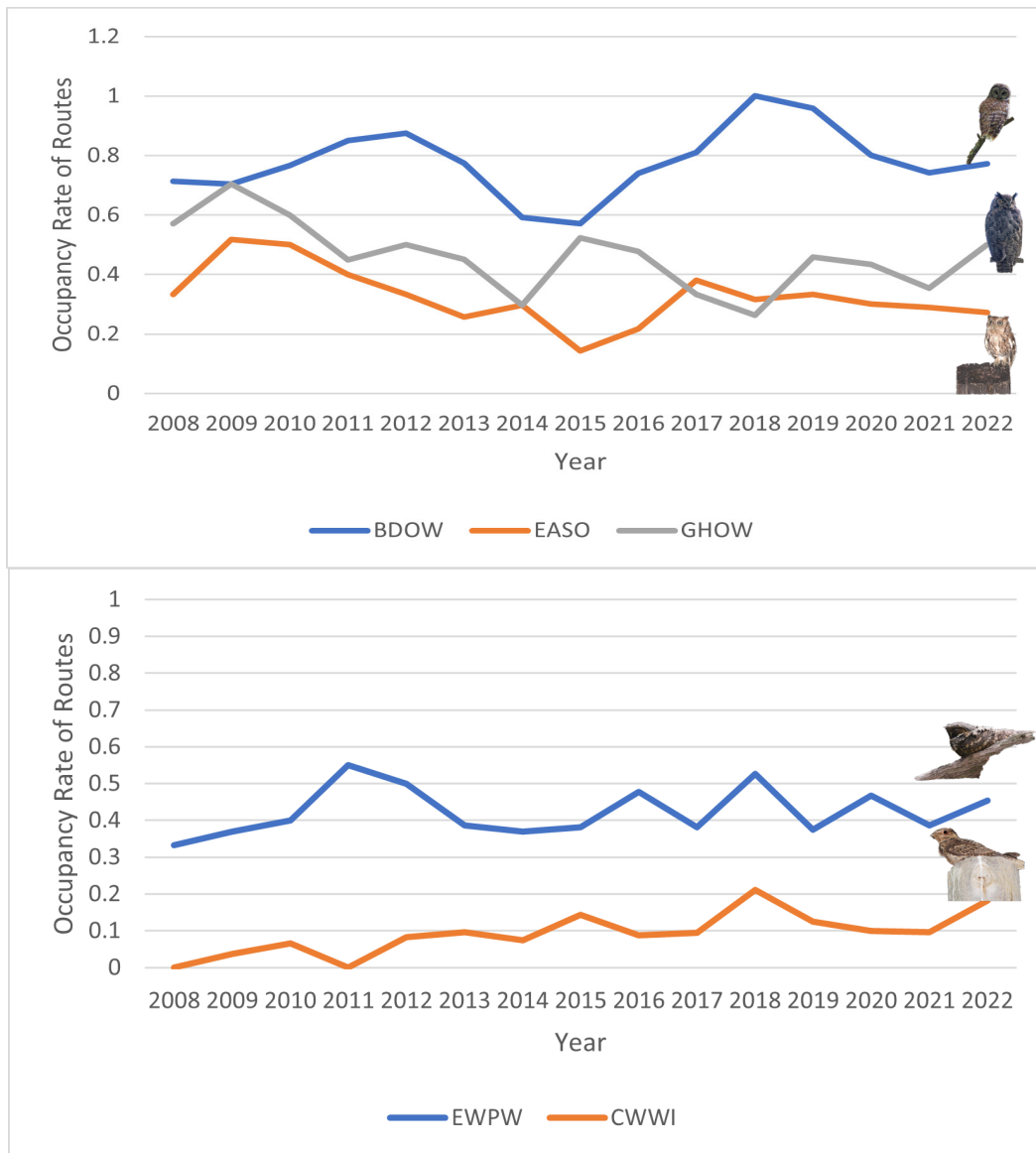


Figure 7. MOON route occupancy rate by year for owls (top) and nightjars (bottom).

APPENDIX A

*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.

EWPW = Eastern Whip-poor-will	GHOW = Great Horned Owl	Long-eared Owl = LEOW
CWWI = Chuck-will's-widow	GHOW = Great Horned Owl	Short-eared Owl = SEOW
CONI = Common Nighthawk	BANO = Barn Owl	*AMWO = American Woodcock
BDOW = Barred Owl	Northern Saw-whet Owl = NSWO	**Other Species

2023 Owl and Nightjar Survey Data Sheet

Observer Name:						County:						Moon above horizon: ____ Yes ____ No					
Date:								Route Name & Number:									
Street Address:												City, State, Zip Code:					
Start time:			End time:			Monitor in 2024: yes/no						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										Used Playback (Circle) EASO: Yes/No BAOW: Yes/No						

[illegible]

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