# The Affect of the Lunar Cycle on the Nocturnal Viewing of Birds at Brookhaven National Laboratory



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## Abstract

To conduct a reliable survey of bird populations, the ideal times for sampling must be known. This ideal holds especially true when examining nocturnal bird populations. This study examines the nocturnal birds present over 3 weeks in a cross-section of habitats found on Brookhaven National Laboratory. Transects through various habitats allowed for a wide selection of birds and their behaviors. After examining weather, lunar, and bird data, it was found that when the moon is at >50% luminosity, the amount of birds detected increases. In addition, the presence of a bird species never formally observed on laboratory property was spotted during this survey. This information will be useful for conducting future night surveys of the laboratory property and will help for future environmental studies.

### Introduction

Often, when thoughts are turned to concerns of bird watching, patience, binoculars, and sunny days spring to mind. While patience still holds true, different techniques are needed for the viewing and documentation of nocturnal birds. Venturing off into the darkness without a plan is fine, but it will take a wing and a prayer to catch a glimpse of these elusive birds. Certain methods must be followed, as well as knowledge of the behaviors of the birds that are present

At Brookhaven National Laboratory (BNL), a variety of habitats allow for a wide range of birds. Located at the western end of the Pine Barrens on Long Island, many nocturnal birds have been sighted here, including Eastern Screech Owls, Whip-poor-wills, and Great Horned Owls. However, these birds are not out at all hours of the night, every single day; instead, they have specific patterns and routines that they follow. Understanding this is the key to constructing a successful survey - for if these characteristics are not taken into account, the reliability of the survey will be questionable. As a result, it is important to do surveys when these birds will be the most active.

While many bird surveys are done on the lab property during the day, very few have been done at night The purpose of this study is to discover when these species are most active, allowing for reliable counts to be done. Understanding what bird populations are present and their size allows for many decisions to be made. Birds can be an excellent indicator of the environmental health of a region, especially when looking at the wide variety of species present in an area. By conducting a baseline study to detect the presence of the nocturnal bird populations, important features can be identified in case there are any future changes and allowing for monitoring of man's impact on the environment. In addition, knowing what bird populations exist will allow land managers to manage their land to the best of their abilities. For if they don't, how will they know how to rectify problems that present themselves or, if these problems are actually situations that are indigenous to the area?



## Methods

Six different transects of approximately the same length were selected for our bird sampling: South Boundary Road/Mildile Boundary Road (SB), Astronomy Way/South Treatment Plant Path (BF), East Boundary Avenue/East Margin Path (EB), Deer Leap/North Fire Break (DL), Renaissance Circle (IR), and Canopy Road/White Pine Path/Upton Road (WB) (See figure 1). Each of the transects were selected to provide a crosssection of the different vegetation types present at the lab. Next, each of the transects were driven over the course of 3 weeks. Each transect was driven twice to ensure that all birds would be accounted for and to see if there were any changes in their behaviors. Using a 4-wheel vehicle, we ventured to different areas of the lab at sunset to see what birds might be present on the property. Along each transect, we stopped every 0.2 mi. to sample and record the visual or auditory presence of the nocturnal birds. The first 5 minutes at a sampling point, we would sit in silence, waiting to see if the birds were readily present. Next, we would play a CD of previous recorded birdcalls on a portable CD player. The CD had the calls of the barn owl, the Eastern screech owl, the great homed owl, and the whip-poor-will. After playing the calls, we would wait an additional 5 minutes to see if any of the calls provoked a se. The order of the calls was varied, as well as the type and volume to provoke a response

Besides the responses of the birds being documented, weather data and lunar phase data were collected each night, to see if either had an effect on the presence of the birds. Lunar data was collected once nightly, while weather data was collected using a Kestrel portable weather station every half hour

#### Photographs of each of the transect routes

















Transect EB

Transect SP



Transect DL

Transect DL



Results

A listing of birds detected on laboratory property can be found on the chart below (figure 2). It should be noted that some birds were heard, but calls were so faint that it was difficult to clearly hear them or record them for later identification

Bird Name	Visual Detection	Auditory Detection
Chuck's-will-widow		Х
Great Horned Owl	Х	
Barn Owl		Х
Whip-poor-will		Х

Figure 2: Birds found on site at Brookhaven National Laboratory

The Barn Owl was detected on the SB transect, as well as the Great Horned Owl. The Whip-poor-will's were detected on the DL transect and the EB transect.. Chuck wills widow was detected on SB, DL, EB, and BF transects. In the beginning of the data collection, the presence of several birds in a variety of species was found. However, as the nights progressed, the presence of the nocturnal birds began to slowly decrease and then disappear all together. We reviewed all of our weather data and lunar cycle data. After comparing the data and the lunar cycle

[1], a probable correlation became evident between the amount of lunar luminosity and the presence of the birds. According to the data, when the moon was at the half-moon phase or larger (>50% in luminosity), there was a greater likelihood of visual or auditory viewing of the nocturnal birds, and when the moon was smaller than the half-moon phase (<50% in luminosity), the likelihood of viewing the nocturnal birds became scarce or non-existent. A probable correlation is illustrated in the graph (figure 3).



Figure 3: Graph illustrating a probable correlation of the amount of moonlight vs. the amount of birds present.

## Discussion

This study had two results, the best times to detect nocturnal birds and the detection of species not seen prior this study on BNL property. The results show a probable correlation that it is best to view these birds during times when the moon is at the half moon phase or greater (>50% illuminated or greater). The lunar cycle plays a large role in the behavior of many organisms, including birds. Some birds, such as the whip-poor-will, which are highly prevalent at BNL, use the lunar cycle to their advantage. It is known that whip-poor-wills will time the hatching of their young so that foraging for extra food can take place when the moon is at its brightest [2]. Thus, surveys of the bird populations should be done when the moon is between the waxing of a half moon to a full moon and waning from a full moon to a half-moon. Surveys should not take place from waning half-moon to new moon and waxing new moon to half-moon

It should be noted that when viewing nocturnal birds, there were many birds that were very active up until the Sun had set. It took some practice and some skill to recognize what birds were actually nocturnal and which birds were still active at twilight. The vocalization difference between the birds prior to sunset during twilight and after was very substantial. It would be imperative to consult with a sunset time guide to ensure that surveying is not occurring too early in the evening.

Birds not previously heard or seen at BNL were detected during the survey. After a comparison with the BNL birding list and the birds detected [3], it was found that the barn owl was never seen prior to this survey. Contact with Wertheim Refuge in Shirley, New York, a bird sanctuary located approximately 5 mi south of Brookhaven National Laboratory, indicated that these birds are indigenous to the area. A possible suggestion is to conduct addition surveys to see if the barn owl is now nesting on the lab property.

In the future, the information gathered in this study will be useful for continued land management of the area. Future use of the area will require careful monitoring of bird populations present and it will be necessary to know what is present.

## References

[1]Fraction of The Moon Illuminated . Retrieved August 3, 2009, from US Naval Observatory Web site:

[2]Wilson, Michael D, and Watts, Bryan D, "The Effect of Moonlight on Detection of Whip-poor-wills: Implications for Long-term Monitoring Strategies" J. Field Ornithology, 77(2):207–211, 2006

[3]Brookhaven National Laboratory Bird Checklist . Retrieved August 3, 2009, from Brookhaven National Laboratory Web site.

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Transect CP