

Analysis of Common Nighthawk Migration Along the Delaware River

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Abstract

The Common Nighthawk (*Chordeiles minor*) is a species of neotropical-nearctic migrant nightjar in the Caprimulgidae family that is in steep decline across much of their range. The goal of this study was to gain further understanding of the common nighthawk's migratory behaviors in connection with environmental factors, through observation and data analysis of their presence as they migrated along the Delaware River in Easton, Pennsylvania. Frost Hollow Overlook was the site used for observation, during the fall migratory season of 2024. Common nighthawk numbers were recorded and analyzed with weather patterns at sunset to determine if any of these factors could have an effect on migratory behaviors.

Introduction

The Common nighthawk (*Chordeiles minor*) is a nightjar that can be difficult to study due to their cryptic markings and under-studied behaviors. Because they have a unique, bat-like flight pattern, it is easiest to spot them amongst other insectivores when they feed on the wing, in the hours before sunset. Common nighthawks are known to rely on flat, gravel rooftops for nesting in urban areas. With this in mind, this study took place approx. 4 miles north of downtown Easton, PA. Observation took place in the evenings from mid-August to late October of 2024, when nighthawk migratory behavior was at its peak.

References

- Brigham, R. Mark, Janet Ng, Ray G. Poulin, and S. D. Grindal. "Common Nighthawk (*Chordeiles Minor*), Version 1.0." *Birds of the World*, March 4, 2020. <https://birdsoftheworld.org/bow/species/commig/cur/introduction>.
- Ng, J.W., E.C. Knight, A.L. Scarpignato, A.-L. Harrison, E.M. Bayne, and P.P. Marra. "First Full Annual Cycle Tracking of a Declining Aerial Insectivorous Bird, the Common Nighthawk (*Chordeiles Minor*), Identifies Migration Routes, Nonbreeding Habitat, and Breeding Site Fidelity." *Canadian Journal of Zoology* 96, no. 8 (August 2018): 869-75. <https://doi.org/10.1139/cjz-2017-0098>.
- Vala, Michelle A., Greg W. Mitchell, Kevin C. Hannah, Julia E. Put, and Scott Wilson. "The Effects of Landscape Composition and Configuration on Eastern Whip-Poor-Will (*Caprimulgus vociferous*) and Common Nighthawk (*Chordeiles minor*) Occupancy in an Agroecosystem." *Avian Conservation and Ecology* 15, no. 1 (2020). <https://doi.org/10.5751/ace-01613-150124>.
- Viel, Jana Gedymin, Alison Donnelly, Glen Fredlund, William Mueller, and Ryan Brady. "Common Nighthawk (*Chordeiles Minor*) Occurrence in Urban Areas Southeastern Wisconsin, U.S.A." *The American Midland Naturalist* 183, no. 2 (04, 2020): 233-245.

Methods

Because this was a purely observational study, the only supplies needed were binoculars for each observer, two tally counters, and a weather meter, as well as the data charts designed for this study. The two observers arrived to the site 1-2 hours prior to sunset and observed until conditions were unsuitable, too dark, or until common nighthawk activity died down. Temperature, precipitation, wind speed, wind direction, cloud coverage, and the moon cycle were recorded each night, as well as the presence of bird species aside from common nighthawks. Observers mainly took focus on bird activity happening north, upstream from Frost Hollow Overlook, as this is typically where common nighthawks could be spotted. Bird species and bats were recorded as well.

Results

Common nighthawks were seen on four out of fourteen observation days in late September and early October, typically during the window of 5 to 6:30pm. Weather data on these days included east or southeast winds, low-to-medium-strength winds, lower temperatures, and varied cloud coverage. On two of the four days, precipitation was recorded. On all four days, there were 15-25 common nighthawks present north of Frost Hollow Overlook, flying above the treeline.



Figure 1: Frost Hollow Overlook, with location of common nighthawk sightings highlighted

	Sunset	Start Time	End Time	Wind Speed	Wind Direction	Temperature (C)	Precipitation	Moon Cycle	Cloud Coverage (%)	Common Nighthawks
8/23/2024	7:46	6:00	8:20	3 MPH	WSW	25	0%	Waning Gibbous	10%	0
8/25/2024	7:43	7:00	8:10	2 MPH	SSW	24	0%	Waning Gibbous	35%	0
8/26/2024	7:41	7:00	8:10	3 MPH	NNE	26	0%	Last Quarter	5-10%	0
8/30/2024	7:35	6:00	8:20	5 MPH	ESE	21	0%	Waning Crescent	100% (Overcast)	0
9/2/2024	7:30	7:00	8:10	9 MPH	NNW	20	0%	New Moon	0%	0
9/13/2024	7:12	6:00	8:10	2 MPH	NE	22	0%	Waxing Gibbous	10%	0
9/16/2024	7:07	6:30	7:45	2 MPH	ESE	21	0%	Waxing Gibbous	40%	0
9/22/2024	6:57	6:00	7:30	3 MPH	E	22	0%	Waning Gibbous	5-10%	20
9/23/2024	6:55	5:00	6:00 (Rain)	5 MPH	ESE	19	0-5%	Waning Gibbous	90-100%	15-20
9/27/2024	6:48	5:00	7:00	5 MPH	E	21	100%	Waning Crescent	90-100%	4 around 5:30, 20 around 6:15
9/30/2024	6:44	6:00	7:00	4 MPH	ESE	19	0%	Waning Crescent	90%	0
10/2/2024	6:40	5:20	7:00	2 MPH	SE	19	0%	New Moon	100% (Overcast)	15-20
10/6/2024	6:34	6:00	7:00	5 MPH	S	19	0%	Waxing Crescent	10-20%	0
10/9/2024	6:29	5:30	7:00	7 MPH	WNW	16	0%	Waxing Crescent	40%	0

Figure 2: Common nighthawk observational data

Conclusion

The main correlation between weather patterns and common nighthawk presence was wind direction. East or southeast winds may be preferred to north or west winds during fall migration, as common nighthawks are heading south. Other pieces of weather data may also affect migratory behaviors, but wind direction was the strongest correlation. While this study did not offer a definitive conclusion as to what weather conditions are most preferable for common nighthawk migration, it highlights the need for further research into how weather and climate change may have more of an effect than is currently understood.

Discussion

Earlier nights had more success, with common nighthawks first recorded around 1-2 hours prior to sunset. Wind direction had the most correlation with common nighthawk presence, as there were east or southeast winds at 2-5 mph every night that nighthawks were observed. This could indicate that wind direction plays a part in common nighthawk migration, perhaps as these winds make it easier for southern migration. This observation could benefit from further research. Precipitation was only recorded on two of the fourteen days, and nighthawks were observed on both of these days. Cool temperatures may also be a migratory trigger, but this correlation requires further research. Common nighthawks were spotted above the treeline, often in swarms with rock doves, presumably feeding on insects in the air. Feeding would take place in this location for up to an hour, before nighthawks began flying south past the observation point. Presence of bats and predator species did not show strong correlation.

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