

Cape May Owl Project: 2024 Annual Report

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Executive Summary

The Cape May Owl Project completed another successful field season in 2024, operating from October through December. A total of 87 owls of three species were captured and banded at our primary study site in Cape May, New Jersey (38.93552° N, 74.9484° W). Northern Saw-whet Owls (NSWO) dominated captures (86.2%), with smaller numbers of Barred Owls (BAOW) and Long-eared Owls (LEOW) also documented.

Key accomplishments in 2024 included:

- Banding of 75 Northern Saw-whet Owls, 7 Barred Owls, and 5 Long-eared Owls
- Pioneering deployment of the first-ever cellular-enabled GPS transmitters on Northern Saw-whet Owls, providing unprecedented insights into their movements and habitat use
- Documentation of 28 recapture events (including one foreign recovery) involving 19 different individuals, providing valuable information on stopover duration
- Collection of standardized biometric data on all captures
- Continuation of our long-term monitoring program that contributes to regional understanding of owl migration patterns in the Mid-Atlantic region

Introduction

The Cape May Owl Project was established in 2023 to monitor owl populations and movements in the Cape May peninsula, with a particular focus on Northern Saw-whet Owl (NSWO) migration. Cape May serves as a significant migratory stopover for saw-whet owls during their autumn migration. Through systematic mist-netting, banding, and the collection of standardized biometric data, the project contributes to our understanding of owl migration phenology, population trends, and demographic characteristics.

This report summarizes findings from the 2024 field season (October-December) and places them in the context of broader research objectives.

Methods

Field Methods

We conducted standardized mist-netting using audio lures following protocols established by Project OwlNet (Brinker et al. 1997). Mist-netting was conducted at our established banding station (CMOWLPRJ) located in Cape May, New Jersey (coordinates: 38.93552° N, 74.9484° W). Nets were operated on suitable nights (low wind, no precipitation) for a minimum of three hours, but often from dusk until approximately dawn. Decision to end for the night were driven by multiple empty net checks after the 3 hour minimum, or (in one case) the breaking of dawn.

The core of our netting operation consisted of the "NSWO lane", a series of six mist nets connected end-to-end to form a continuous net line, with an audio lure broadcasting Northern Saw-whet Owl calls positioned behind the third net. This standard configuration has been generally maintained since Katy Duffy's work from 1980 to 2022, though the exact location has shifted several times over the decades due to habitat changes. At each end of the NSWO lane, we positioned perpendicular "blocker nets" designed to capture larger owl species that might be attracted to the NSWO calls.

Throughout the season, we experimented with several additional net configurations, including a series of larger owl nets in a small woodlot closer to the banding station, several large owl nets along existing trails, and

additional NSWOW nets in the wooded area adjacent to the Meadows fields. While the effort varied with these experimental configurations, the NSWOW lane remained constant throughout the season, providing methodological continuity with the historical dataset.

Banding operations took place on 33 nights between October 15 and November 27, 2024, representing 75% of potential nights during this period. October operations included 13 banding nights, while November operations included 20 banding nights. The seasonal capture rate was 2.64 owls per night of effort.

All captured owls were equipped with appropriate USGS aluminum bands. For each bird captured, we recorded:

- Standard measurements (wing chord, mass)
- Age (based on molt patterns)
- Sex (determined via morphometric discriminant functions)
- Fat score

A subset of Northern Saw-whet Owls was fitted with GPS transmitters to track movements after departure from Cape May.

Data Analysis

We summarized capture data by species, sex, and age class. For Northern Saw-whet Owls, we calculated sex-specific metrics for wing length and mass. Recapture data were analyzed to estimate stopover duration.

Results

Capture Summary

A total of 87 individual owls representing three species were captured and banded during the 2024 field season. Northern Saw-whet Owls made up the vast majority of captures (86.2%), with smaller numbers of Barred Owls (8.0%) and Long-eared Owls (5.7%).

Table 1: Total Captures by Species

Species	Count	Percentage
Northern Saw-whet Owl	75	86.2%
Barred Owl	7	8.0%
Long-eared Owl	5	5.7%
TOTAL	87	100.0%

Northern Saw-whet Owl Demographics

Northern Saw-whet Owl captures were dominated by hatch-year birds (60 individuals, 80.0% of NSWOW captures). Sex ratio was notably skewed toward females (65.3%) compared to males (14.7%), with 20.0% of individuals unable to be reliably sexed based on available metrics.

Table 2: Northern Saw-whet Owls by Age and Sex

Age Class	Males	Females	Unknown	Total
Hatch Year	9	39	12	60
Second Year	0	7	2	9
Third Year	0	0	1	1
After Second Year	2	3	0	5
TOTAL	11	49	15	75
Percentage	14.7%	65.3%	20.0%	100.0%

Other Owl Species**Table 3a: Barred Owls by Age and Sex**

Age Class	Males	Females	Unknown	Total
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Hatch Year	3	1	3	7
TOTAL	3	1	3	7
Percentage	42.9%	14.3%	42.9%	100.0%

Table 3b: Long-eared Owls by Age and Sex

Age Class	Males	Females	Unknown	Total
Hatch Year	0	2	1	3
After Second Year	0	1	0	1
After Hatch Year	1	0	0	1
TOTAL	1	3	1	5
Percentage	20.0%	60.0%	20.0%	100.0%

Seasonal Patterns and Effort

Owl captures were distributed across the field season, with a peak in November when 48 individuals (55.2% of season total) were captured. Northern Saw-whet Owl migration peaked in early November, though substantial numbers were captured in October as well. Barred Owl captures were distributed evenly throughout the season, while Long-eared Owls were only captured during November.

When standardized by effort, capture rates were higher in October (2.77 owls per night) than in November (2.40 owls per night), suggesting a slightly earlier peak in migration, or earlier cutoff, than the raw numbers might indicate. This pattern generally aligns with the expected phenology of Northern Saw-whet Owl migration through the region, though the unseasonably warm winter may have contributed to a shorter migration season as migration distances are curtailed.

Table 4: Monthly Capture Totals

Month	NSWO	BAOW	LEOW	Total
October	34	2	0	36
November	40	3	5	48
December	1	2	0	3
TOTAL	75	7	5	87

Recaptures and Stopover Duration

We documented 27 recapture events involving 18 different individual owls that were originally banded at our station (16 Northern Saw-whet Owls and 2 Barred Owls). Additionally, we documented one foreign recapture (a Northern Saw-whet Owl banded in Maryland the previous year). Of our station-banded birds, most (12) were recaptured only once, while five individuals were recaptured twice, and one individual was recaptured three times.

Table 5a: Recapture Frequency

Number of times recaptured	Number of birds
1	12
2	5
3	1

Table 5b: Time Between Initial Capture and Last Recapture (Selected Individuals)

Band Number	Species	Initial Capture	Last Recapture	Days Between
112454647	Northern Saw-whet Owl	10/25/2024	11/03/2024	9

112454651	Northern Saw-whet Owl	10/26/2024	11/27/2024	32
112454686	Northern Saw-whet Owl	11/09/2024	12/08/2024	29
112454691	Northern Saw-whet Owl	11/13/2024	12/08/2024	25

The mean interval between initial capture and final recapture was 11.3 days (range: 1-32 days), suggesting an average minimum stopover duration of approximately 11 days for Northern Saw-whet Owls at Cape May.

Foreign Recovery

During the 2024 field season, we documented one foreign recovery of a Northern Saw-whet Owl (band number 1124-03074). Upon reporting this band to the Bird Banding Laboratory (BBL), we learned this third-year female was originally banded by Gene Groshon on November 7, 2023, near Dowell, Calvert County, Maryland, before being recaptured at our Cape May station on October 26, 2024.

Following the BBL notification, we reached out to Gene (who is a professional colleague within the close-knit owl banding community) for more details about the bird's original capture. In personal correspondence, Gene provided the original banding measurements and observations. When first banded, this owl exhibited unusually large biometrics, with a wing chord of 144 mm (flat measurement of 150 mm), tail length of 65 mm, and bill length of 10.7 mm. Her weight at original banding was 104 g, and she has a similar weight (103 g) when recaptured at Cape May. Both banding teams independently noted this individual's remarkably robust size for a female Northern Saw-whet Owl.

The recapture of this individual provides valuable evidence of migratory connectivity between Maryland and New Jersey, suggesting movement patterns along the Atlantic Coastal Plain. This represents one of several

documented cases of Northern Saw-whet Owls moving between these regions during fall migration.

Transmitter Deployment

In 2024, seven Northern Saw-whet Owls were equipped with GPS transmitters to track their movements after departure from Cape May. These individuals represented different age classes and both sexes, providing diversity for movement analysis.

Table 6: Northern Saw-whet Owls Fitted with GPS/Cellular Transmitters

Band Number	Age	Sex	Capture Date	Transmitter ID
112454662	Hatch Year	Female	11/02/2024	350916062236792
112454679	Second Year	Female	11/03/2024	350916062236602
112454689	After Second Year	Male	11/09/2024	350916062236735
112454691 ¹	Hatch Year	Female	11/13/2024	350916062236545
112454651 ²	Hatch Year	Female	11/26/2024	350916062236545
112454698	After Second Year	Male	11/18/2024	350916062236529
112454699	Hatch Year	Unknown	11/24/2024	350916062236685
112454700	After Second Year	Female	11/25/2024	350916062236263

¹ Transmitter removed on 11/19/2024 due to harness issues and approximately 8g weight loss since tagging.

² Received redeployed transmitter from bird 112454691.

Biometrics

Biometric data collected from Northern Saw-whet Owls continues to support the known sexual dimorphism in the species, with females being larger than males in both wing length and mass.

Table 7: Biometrics Summary for Northern Saw-whet Owls

Wing Chord (mm):

Sex	Min	Max	Average	Sample Size
Male	126.0	139.0	130.5	11
Female	129.0	146.0	138.6	49
Unknown	126.5	140.0	135.7	15

Mass (g):

Sex	Min	Max	Average	Sample Size
Male	73.5	97.1	80.1	11
Female	81.5	106.5	93.8	49
Unknown	79.4	92.0	84.9	15

Historical Context

The Cape May Owl Project continues the long-term owl banding and monitoring efforts at Cape May that began in 1980 under Katy Duffy, who operated the station until 2022. In 2023, the current team (led by Dr. David La Puma along with Charlie Roberto, Mike Lanzone, and Dr. Trish Miller) assumed responsibility for maintaining this valuable long-term dataset while enhancing research capabilities through the addition of transmitters to track owl movements.

Table 8: Historical Capture Data (1980-2022) vs. 2024 Season

Species	2024 Count	Historical Average (1980-2022)	Last 5 Years Average (2018-2022)
NSWO	75	96.0	84.2

BAOW	7	0.3	0.6
LEOW	5	12.5	2.4
Total	87	108.7	87.2

Over the 43-year history of owl banding operations at Cape May (1980-2022), a total of 4,566 owls of the three target species have been banded, including 4,031 Northern Saw-whet Owls, 11 Barred Owls, and 524 Long-eared Owls. Annual capture totals have varied considerably, with Northern Saw-whet Owl captures ranging from as few as 2 (in 2008) to as many as 635 (in 1995).

Discussion

2024 Season in Historical Context

The 2024 field season resulted in the capture of 87 owls across three species, almost exactly matching the average annual capture total from the previous five years (87.2 owls/year from 2018-2022), but somewhat below the long-term historical average of 108.7 owls/year since 1980.

Northern Saw-whet Owl captures (75 individuals) were slightly below both the historical average (96.0/year) and the recent five-year average (84.2/year). This suggests a relatively typical but somewhat subdued migration year for this species. Early in the season, reports from banding stations farther north suggested the potential for a larger flight of Northern Saw-whet Owls to reach Cape May. However, as the season progressed with unseasonably warm temperatures persisting across the region, capture rates at our station dropped during November. This pattern suggests that many birds may have "short-stopped" their migration in the Mid-Atlantic region rather than continuing to more southern locations. This interpretation is further supported by our telemetry data, which shows most of our tagged owls overwintering in the general region rather than continuing a more extensive southward migration.

The age ratio of Northern Saw-whet Owls was heavily skewed toward hatch-year birds (80% of captures), which could suggest a productive breeding season in 2024 for this species in its breeding range to the north.

Barred Owl captures (7 individuals) were notably higher than both the historical average (0.3/year) and recent five-year average (0.6/year). This represents the highest annual capture total for Barred Owls in the 44-year history of the project, potentially suggesting a southward movement of this typically resident species, perhaps due to food resource limitations in their breeding range, or perhaps high productivity locally. All captured Barred Owls were hatch-year birds, further supporting the hypothesis of a post-breeding dispersal movement.

Long-eared Owl captures (5 individuals) were below the long-term historical average (12.5/year) but higher than the recent five-year average (2.4/year). This pattern aligns with the general decline in Long-eared Owl captures over the past two decades, likely reflecting broader population declines of this species throughout the Northeast.

Recapture Patterns and Stopover Duration

Recapture data from 2024 suggested an average minimum stopover duration of approximately 11 days for Northern Saw-whet Owls at Cape May, with some individuals remaining for at least 32 days. These findings are consistent with previous studies of migratory stopover behavior in this species, which have documented stopover periods of 1-14 days (Whalen & Watts 2002, Project OwlNet unpublished data).

The relatively long stopover durations observed may indicate that Cape May provides suitable habitat and foraging opportunities for migrating saw-whet owls. The peninsula's geographic position at the southern tip of New Jersey likely concentrates migrants in this area, with Delaware Bay presenting a potential barrier to further movement that may cause some individuals to remain in the area for an extended period before continuing their migration. As with other species, like American Woodcock, year-on-year Cape May might

provide the sufficient resources for successful stopover of Northern Saw-whet Owls.

Transmitter Program Expansion

The deployment of 7 transmitters on Northern Saw-whet Owls in 2024 represents a significant expansion of the project's research capabilities. This transmitter program provides unprecedented insights into post-capture movements, habitat use, and migration routes and wintering of saw-whet owls departing Cape May. The Flicker ULP (Ultra-Low Power) GPS transmitters used in this study are among the smallest available, weighing just 3-4g.

These transmitters are programmed to collect GPS locations at regular intervals and transmit the data via cellular phone networks when within range of a cell tower. This technology allows for detailed tracking without the need to recapture the birds, providing continuous data on movements across potentially large geographic areas. Four of the transmitters were purchased by The Nature Conservancy, while the remaining units were funded through a successful crowdfunding campaign with significant support from an anonymous donor.

The fact that these transmitters were deployed on individuals of different age classes (3 HY, 1 SY, 3 ASY) and sexes (4 females, 2 males, 1 unknown) increases the value of this effort by allowing for comparisons across these demographic categories. Initial data from the transmitters suggested varied movement patterns, with some individuals remaining in the Cape May area for extended periods while others departed more rapidly, reinforcing the findings from our recapture data.

Of the units that continue to send data at the time of this writing, all of the owls appear to be overwintering in the Cape May region, with two of the units that have stopped transmitting showing movement as far south as coastal Maryland, and as far north as Philadelphia, PA. Based on a single transmitted owl in 2021, we would anticipate these owls to start heading north in mid-April, and therefore look forward to updating this report with those findings in the near future.

Public Outreach

In addition to our research activities, the Cape May Owl Project engaged in significant public education efforts throughout the 2024 field season. On 12 occasions, we conducted impromptu owl demonstrations at The Nature Conservancy's South Cape May Meadows Preserve. These events were organized opportunistically following successful owl captures at the banding station, with notifications sent to interested participants via a text message group.

The demonstrations took place in the Preserve's parking lot, where our team would provide presentations about the Cape May Owl Project, including information on basic owl biology and ecology, as well as descriptions of the project's goals and objectives. Attendees had the unique opportunity to observe these elusive nocturnal birds up close before their release, creating memorable educational experiences for visitors of all ages.

Over the course of the 2024 season, we engaged more than 200 attendees through these impromptu educational events. Additionally, we hosted visits to the banding operation for The Nature Conservancy staff, visiting researchers, and representatives from various non-governmental organizations, providing a behind-the-scenes look into owl research and monitoring techniques.

These outreach efforts serve a dual purpose: they not only enhance public understanding of owl conservation and migration ecology but also build critical community support for scientific research in the Cape May region.

Conclusions and Future Directions

The 2024 field season of the Cape May Owl Project successfully continued the long-term monitoring of owl migration in Cape May, maintaining the valuable 44-year dataset initiated by Katy Duffy in 1980. The transition to the current research team in 2023 has preserved methodological consistency while enhancing research capabilities through the addition of transmitters and expanded analyses.

The most significant finding from 2024 was the record number of Barred Owl captures, suggesting potential changes in the movement patterns of this typically resident species. This warrants continued monitoring to determine whether this represents an anomalous irruption year, the beginning of a shift in migratory behavior for this species, or an increase in the local population.

On the transmitter front, we've noticed some evidence of antenna damage likely caused by the owls themselves. The evidence of this is in the dropped signal strength of units that continue to connect and send data over the cell network, and the loss of GPS functionality on several units that are still connecting over the cellular network. We have worked with the manufacturer to address these issues and expect our next iteration of transmitters to be developed with further reinforced antennas. Of course we are aware of the limitations of such a small transmitter, so some failure was expected, but we plan to keep working to improve on the design of these transmitters for future deployment.

Looking ahead to future seasons, we recommend:

1. **Continuing standardized monitoring** using consistent protocols to maintain the integrity of this long-term dataset
2. **Expanding transmitter deployments** to include more Barred Owls and potentially Long-eared Owls if captures permit
3. **Enhancing data collection** on habitat use by conducting systematic monitoring of habitat characteristics in areas where transmitted birds are detected
4. **Strengthening regional coordination** with other owl banding stations to better understand the broader patterns of owl movements throughout the Northeast
5. **Developing public education initiatives** to increase awareness of owl conservation and the scientific research conducted by the Cape May Owl Project

These efforts will ensure that the Cape May Owl Project continues to contribute valuable scientific insights into owl migration patterns, stopover ecology, and population dynamics for years to come.

Acknowledgments

The Cape May Owl Project expresses sincere gratitude to Katy Duffy for her 43 years of dedicated owl research at Cape May, establishing one of the longest-running owl monitoring programs in North America. Her meticulous methods and dedication created a foundation upon which the current project builds.

We thank The Nature Conservancy for providing access to the South Cape May Meadows Preserve, and Bob Mullock for access to the banding site and logistical support. The Cape May Point Science Center has been instrumental in providing additional logistical and financial support.

Funding for transmitters came from The Nature Conservancy (4 transmitters) and a successful GoFundMe campaign (6 transmitters) with significant support from an anonymous donor.

Special thanks to everyone who helped conduct field operations throughout the 33 nights of the 2024 season, often working from dusk until dawn in challenging conditions. The consistency of our banding effort (operating on 75% of available nights during the season) reflects their extraordinary dedication to this research. Specifically, our volunteers included Stephanie Bartlett, Charlotte Catalano, Harrison Hepding, Patti Hodgettes, Ben Langbien, Michael O'Brien, Jesu Sepúlveda Maleaves, Maia Nguyen, Martina Nordstrand, Aiden Place, Kyle Shepard, Lena Usyk

We must also recognize a number of visitors who dropped by with some delicious homemade snacks, helped us get through the long nights and early mornings with a board game (Blokus, anyone?), a round of jokes, or a great story. You are a big reason we were able to accomplish so much!

References

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Appendix 1: Select Maps

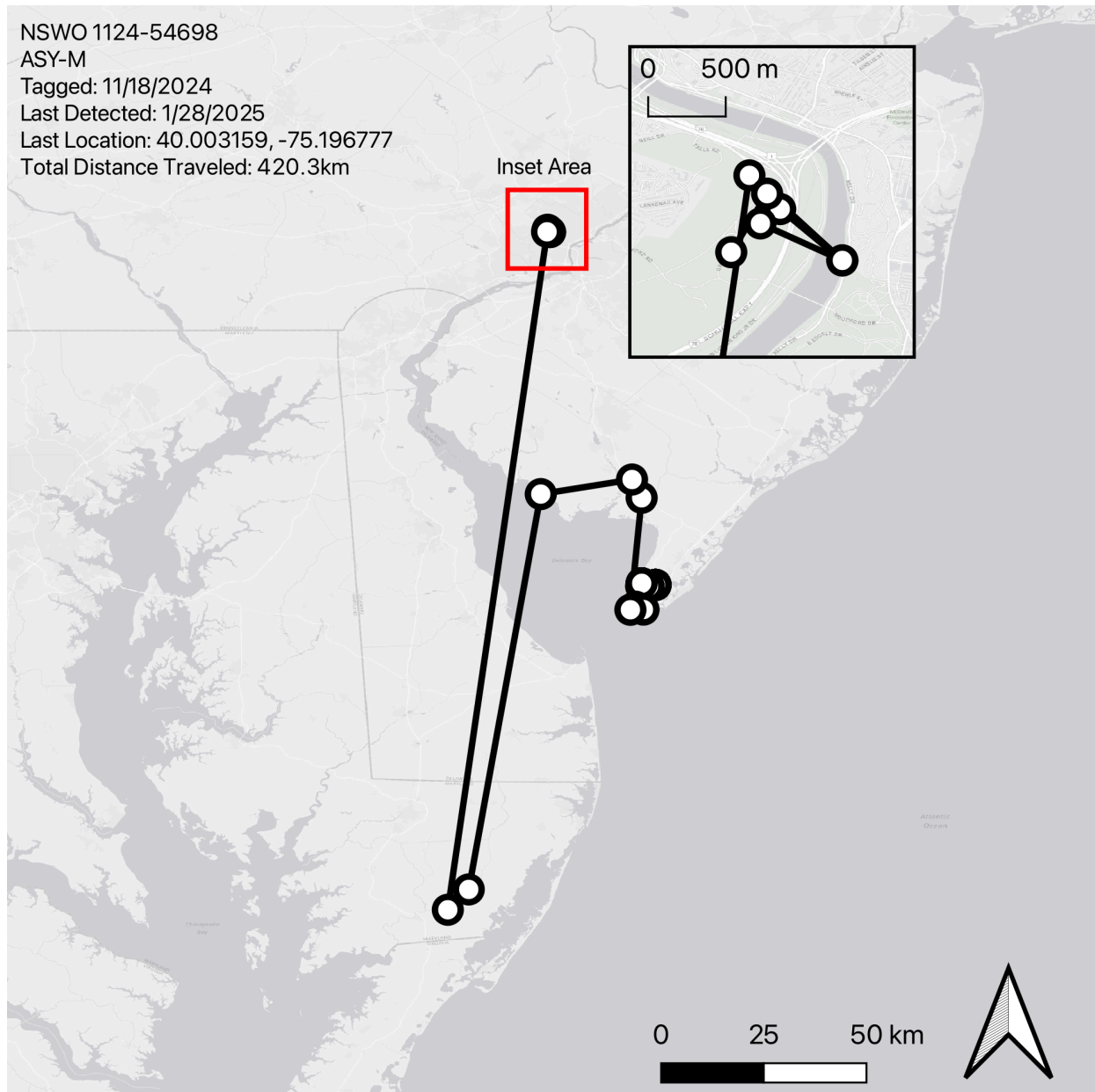


Figure 1. Map of NSWO 1124-54698, an after-second-year male tagged on 11/18/2024. This bird migrated up the Delaware Bay shore, and then south across Delaware Bay to the Eastern Shore of Maryland, before turning back north and settling in at a park along the Delaware River, in Philadelphia. His last transmission was on 1/28/2025 and given the signal strength of the transmission we expect he damaged his antennas.



Figure 2. Heat map of NSW0 1124-54651, a Hatch-year Female that spent the winter in West Cape May after being tagged on 11/26/2024. At the time of the report she is still in the area.

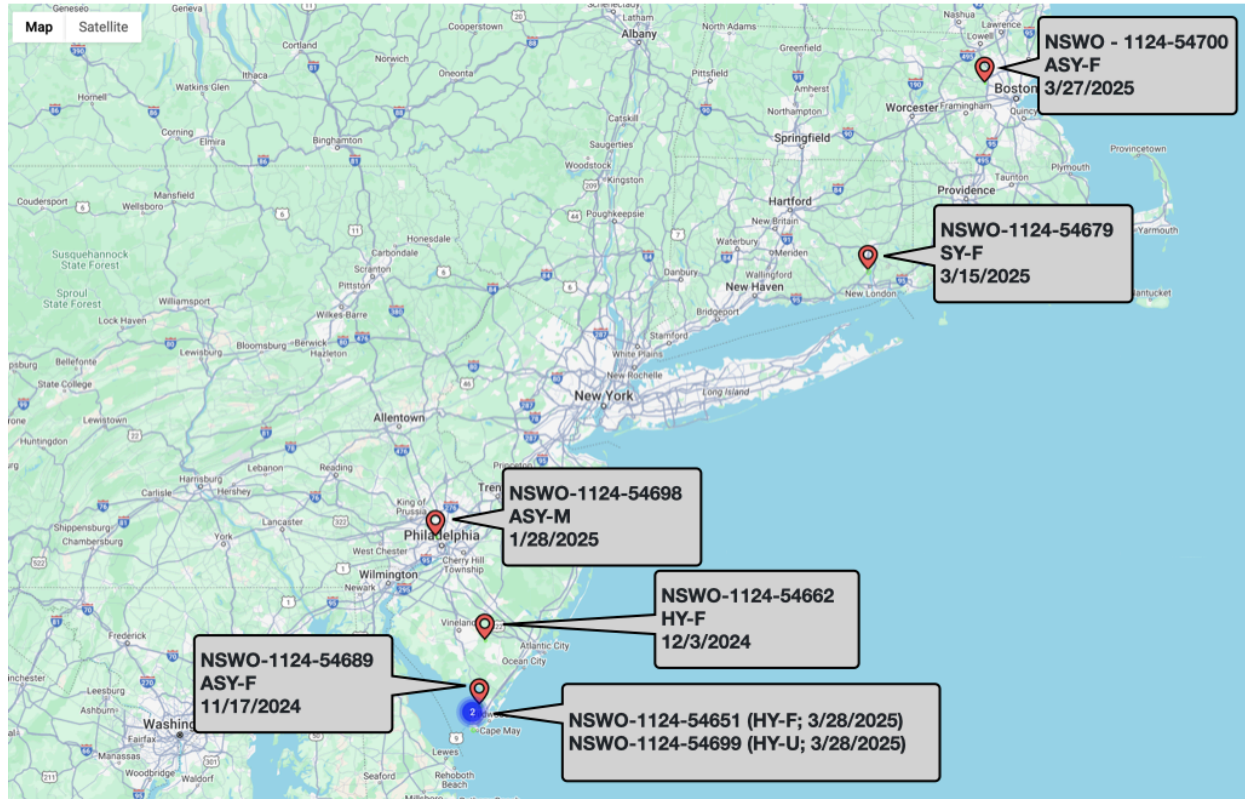


Figure 3. Last detection location and date, at the time of this report, for all seven owls currently wearing transmitters.