Migration patterns and habitat use of raptors in the Upper Midwest

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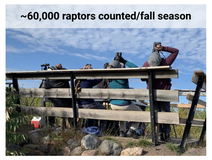
Background

- Each fall, ~60,000 raptors are counted migrating through Duluth at Hawk Ridge.
- Trends from count data that are synthesized in the Raptor Population Index (RPI) indicate that many raptors are in decline in some parts of their range.
- Over 2,500 raptors are banded each fall at Hawk Ridge and can provide insight into the potential causes of these declines.
- One piece of lacking information is full-annual cycle landscape and habitat usage of birds counted during fall migration at Hawk Ridge.



Project Goals

Main goal: Identify locations used by Minnesota birds during the full-annual cycle to improve conservation and management strategies.

- Identify and connect breeding, stopover, and non-breeding locations of Minnesota birds.
- Identify locations and habitats important to Minnesota birds.

Methods

Stable isotope analysis of feathers
Feathers will be collected during fall migration and analyzed for Hydrogen and Strontium isotopes.

- Hydrogen (δ^2H) - latitudinal gradient
- Strontium ($^{87}Sr/^{86}Sr$) - granular

Transmitters (GPS/Cellular)
Transmitters designed by Cellular Tracking Technologies (CTT) will be deployed on adult raptors.

- Sharp-shinned Hawk
- Northern Harrier
- American Goshawk

Preliminary Fall Movements

During fall migration 2024, we deployed transmitters on:

- 3 male Sharp-shinned Hawk
- 3 female Sharp-shinned Hawk
- 5 male Northern Harrier
- 1 female Northern Harrier

Sharp-shinned Hawk

- FlickerGPS
- 1 GPS point per day
- Daily connection to cellular tower

Adult female (left) and male (right) Sharp-shinned Hawk outfitted with FlickerGPS.

Figure 1. Tracks based on daily GPS fix for adult Sharp-shinned Hawks outfitted with transmitters during the fall 2024 season.

Northern Harrier

- FlickerGPS - male
- ES-420 - female
- Duty cycle based on battery life; every 30, 60, or 360 min GPS points
- Daily connection to cellular tower

Adult male Northern Harrier with FlickerGPS.

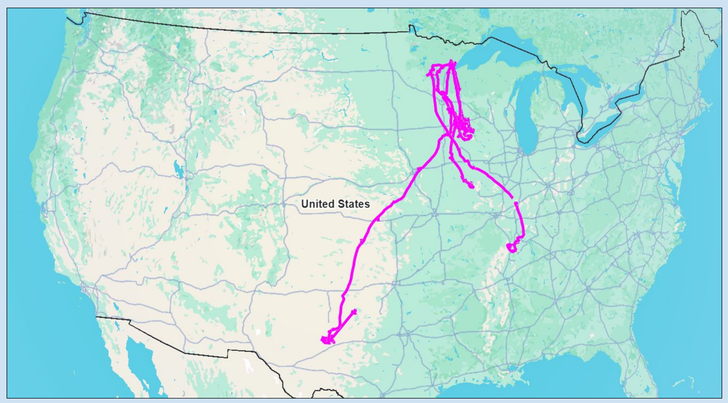


Figure 2. Movement tracks for adult Northern Harriers outfitted with transmitters during the fall 2024 season.

Discussion

- All Sharp-shinned Hawks that received a transmitter took similar migration routes south from Duluth.
- Northern Harriers that received transmitters currently have shown variability in migration routes and distances traveled.
- Two transmitters were deployed on adult male Northern Harriers in spring 2024 (not shown here). These two birds exhibited very different movements from each other that will be analyzed in more detail.

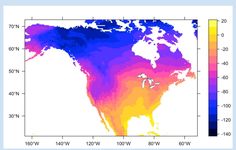
Next Steps:

Transmitters

- Habitat analysis of breeding, stopover, and wintering locations.
- Assess differential migration by age, sex, and timing of migration through Duluth.

Isotope Analysis

- Breast feathers were collected from juvenile raptors during the fall 2024 season.
- Analyze stable isotope data from fall migration to assign natal origins and determine patterns in migration timing.



Acknowledgements

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References

Crowley, B. E., C. P. Bataille, B. A. Haak, and K. M. Sommer. 2021. Identifying nesting grounds for juvenilemigratory birds with dual isotope: an initial test using North American raptors. Ecosphere 12(10):e03765. 10.1002/ecs2.3765