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Analyzing Post-fledging Movements, Survival, and Space Use of First-year Black Vultures (Coragyps atratus) in Kentucky

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Analyzing Post-fledging Movements, Survival, and Space Use of First-year Black Vultures (*Coragyps atratus*) in Kentucky

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Introduction

- The black vulture (*Coragyps atratus*) is a gregarious, communally-roosting Neotropical scavenger whose breeding range extends from the southern U.S. down throughout Central and South America[1]
- In recent decades, this species has undergone widespread population increases and range expansions, unfortunately, this has led to an increase in conflict with humans[2,34,5,6]
- Lethal management is increasingly a common tool to solve these conflicts but problematic since information on the survival and movement the species is lacking
- This is especially true for the sensitive post-fledgling age class[7]
- Here we present preliminary spatial and survival data from a subset of nine first-year black vultures affixed with GPS-GSM transmitters as nestlings

Objectives

- Determine survival rates of first-year black vultures over a six-month period
- Calculate monthly home range estimates
- Calculate and visualize Utilization Distributions (UD) to estimate space use

Figure 1. A nestling vulture fitted with a backpack-mounted GPS-GSM transmitter.

Methods

- All analysis conducted in R version 4.2.1
- Spatial data uploaded via Movebank into R
  - Outliers removed via built-in processes
- Movement model generated via the Dynamic Brownian Bridge Movement Model (dBBM) (package = 'Move')[8] method
- Package 'AdehabitatHR' used to estimate core area and home range values[9]

Survival

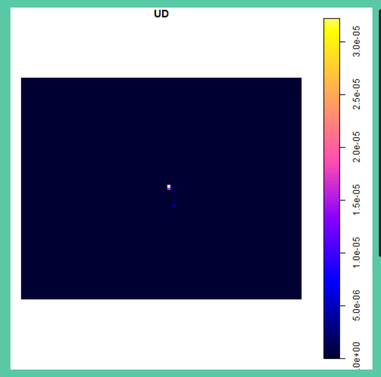
- No mortalities were observed in any tracked individual (n=9) during the duration of this study (six months)

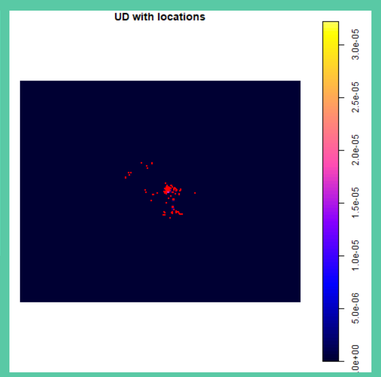
Home Range and Core Area Estimation

Individual #1222	AUG '21	SEP '21	OCT '21	NOV '21	DEC '21	JAN '22	MEAN	SE
Core Area (km^2)	0.02	7.56	25.98	22.82	29.18	15.81	16.89	4.62
Home Range (km^2)	0.17	149.95	174.21	153.73	197.98	90.79	127.81	29.38

- This study (n=1 individual))
  - Mean Core Area = 16.89 km^2 ± 4.62km^2
  - Mean Home Range = 127.81 km^2 ± 29.38 km^2
- Comparison (Adult birds (n=13)) - (Holland et al. 2017)
  - Mean Core Area = 0.44 km^2 ± 0.06 km^2
  - Mean Home Range = 30.3 km^2 ± 2.6 km^2

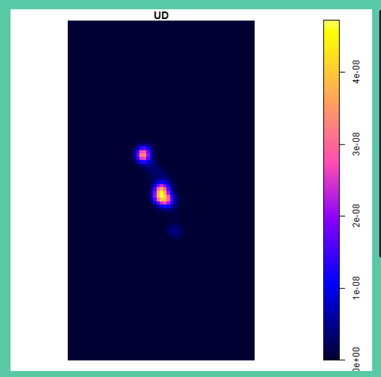
Utilization Distribution

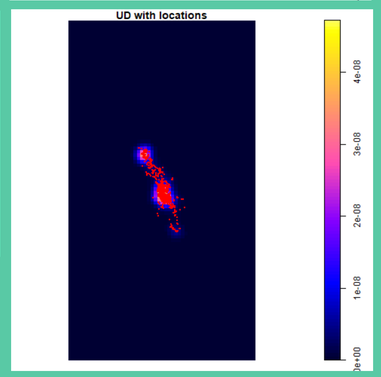




Figures 2a and 2b. UD plots created in R from August 2021 data. 2a displays UD data and 2b displays UD data with location points for the month.

AUGUST 2021





Figures 3a and 3b. UD plots created in R using data from January 2022. 3a displays UD data and 3b displays UD data with location points for the month.

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Discussion

- Preliminary analysis – sample size low
- First-year survival rates excellent
- Comparing core area/home range estimates and UDs over time will provide valuable insights into the temporal and spatial patterns of juvenile black vulture movements

Future Analysis

- Complete HR/UD analyses on all individuals
  - Calculate individual and sibling overlap
- Calculate distance to natal area for each location
  - Estimate time spent in natal area
  - Note evidence of dispersal
- Fine tune error models
- Conduct a fine-scale habitat assessment

Acknowledgements

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