



# FALL STOPOVER ECOLOGY OF THE LEAST SANDPIPER (*CALIDRIS MINUTILLA*) IN IOWA

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# STUDY OBJECTIVES

## **Two primary objectives:**

- **Estimate local survival and residency time of the Least Sandpiper (LESA) at Red Rock Reservoir, Iowa.**
- **Assess the influence of body condition, time of season, reservoir pool level, and age on local survival.**



# STUDY AREA

Western extent of Red Rock Reservoir in central Iowa

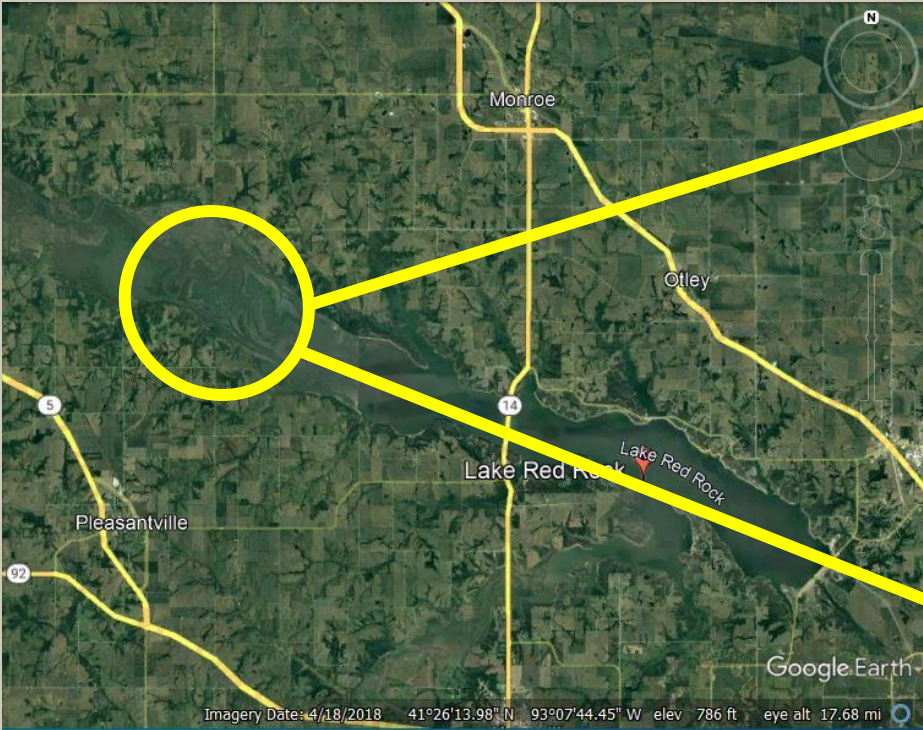


Photo acknowledgment: Google Earth (both images)

# METHODS

- LESAs were captured using mist nets
  - 27 July – 27 August 2021
  - 21 July – 25 August 2022
- Fitted with glue-on VHF transmitters (0.5 g)
- Tagged birds were tracked every 1-2 days with a hand-held VHF YAGI antenna
  - Tracking stopped when 3 consecutive searches were made with no successful detection
  - Tracking occurred simultaneously with trapping and waterbird/vegetation surveys



ATS model A2415 glue-on VHF transmitter tag on a Least Sandpiper.



Tandem mist-net set up for Least Sandpiper trapping.



# DATA COLLECTION

- Morphological measurements for every individual included:
  - Body mass (g)
  - Tarsus and culmen length (mm)
  - Flattened wing chord (mm)
  - Body condition calculated as  $g/(mm^3)$
- Plumage was used to assign age
- A bird was present at the site if signal was heard; non-detected (absent) if not
- Daily pool level obtained from Rivergages site (06:00)
  - Used the deviation from conservation pool (m) rather than raw number



Researcher relocating tagged individuals.



Least Sandpiper with a glue-on VHF transmitter tag, Red Rock Reservoir, IA 2022.

# ANALYSES

- Used Cormack-Jolly-Seber (CJS) model to estimate daily local survival ( $\varphi$ ) and detection probability ( $p$ )
  - Detection probability did not meet assumption for known fate
  - Developed a model set to explore:
    - Seasonal patterns
    - Daily pool level
    - Age
    - Body condition
    - Included interactive and additive effects
- Calculated residency time (in days) using the daily survival probability

## (TAGGING SUMMARY)

2021

- 9 capture events
- 60 tagged
  - 45 adults
  - 15 juveniles

2022

- 10 capture events
- 80 tagged
  - 61 adults
  - 19 juveniles

## RELOCATION SUMMARY

### 2021

- 43 ind. relocated at least once
- 31 ind. relocated >1 time
  - Last bird recorded on 13 Sept
  - Most relocations per ind. = 8
- Total exposure days = 390

### 2022

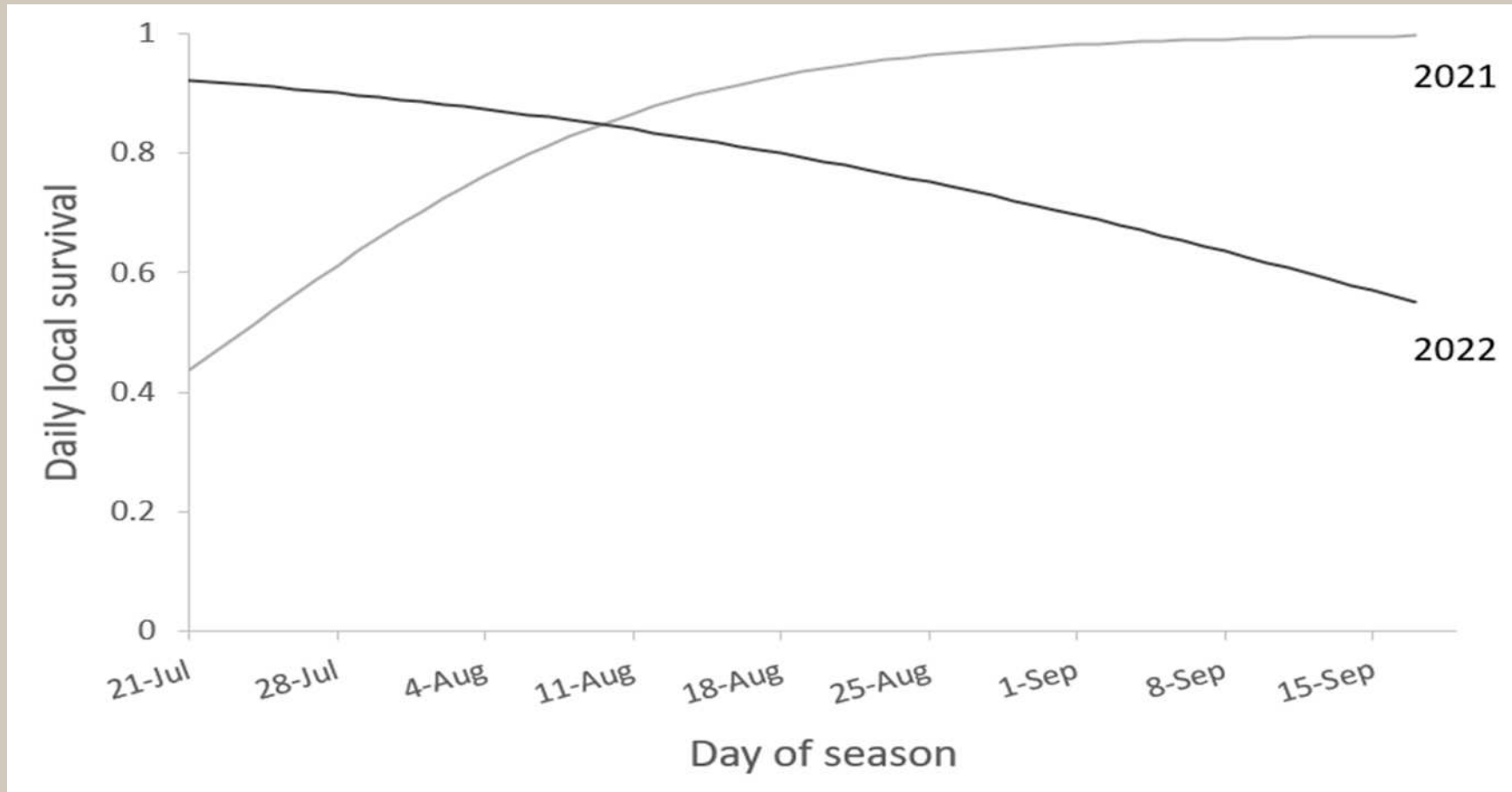
- 61 ind. relocated at least once
- 50 ind. relocated >1 time
  - Last bird recorded on 1 Sept
  - Most relocations per ind. = 9
- Total exposure days = 298



## EFFECTS ON LOCAL SURVIVAL

- Key effects on local survival
  - (Top model)
    - Year; 2021 < 2022
    - Day of season\*year; 2021 > 2022
  - (Next model)
    - Year\*pool deviance; minimal PD < higher PD
    - Age; no effect but a trend towards adults > juveniles
  - (Other models)
    - BCI; no effect

## DAILY LOCAL SURVIVAL (DAY OF SEASON)



### Estimates:

(2021) 0.44 to 0.99

(2022) 0.55 to 0.92

Least Sandpiper probability of daily local survival given time of season on Red Rock Reservoir, IA 2021-2022

# DAILY LOCAL SURVIVAL (POOL DEVIANCE)

Adult local survival:

(2021) 0.62 to 0.96

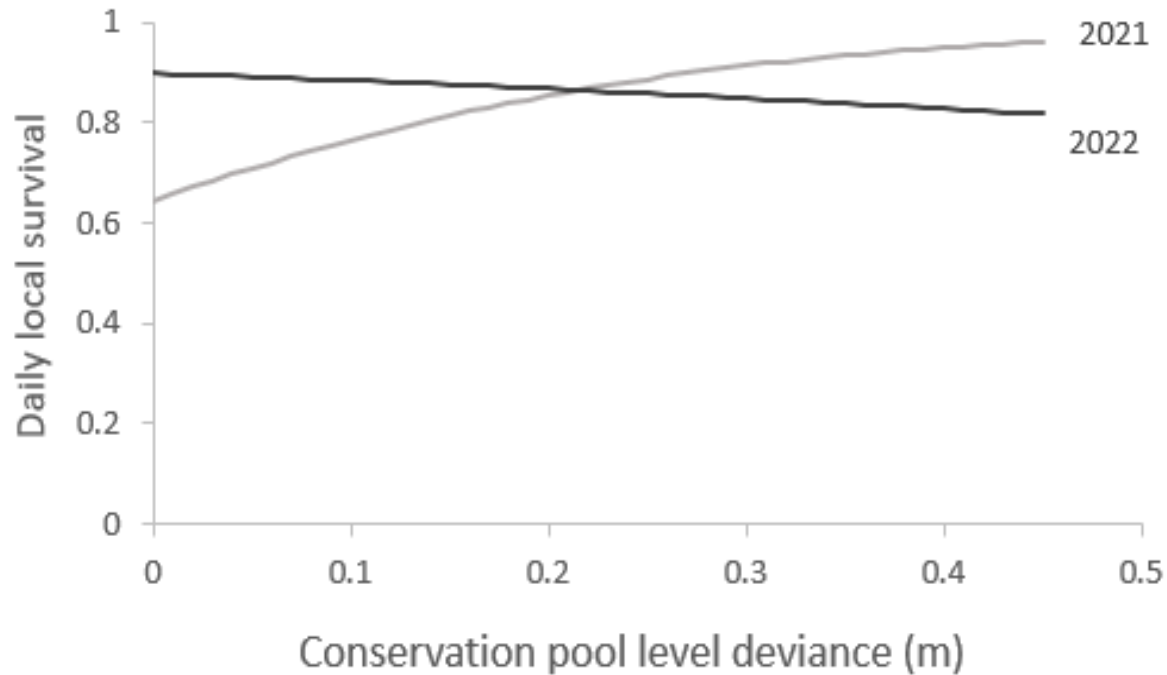
(2022) 0.82 to 0.90

Juvenile local survival:

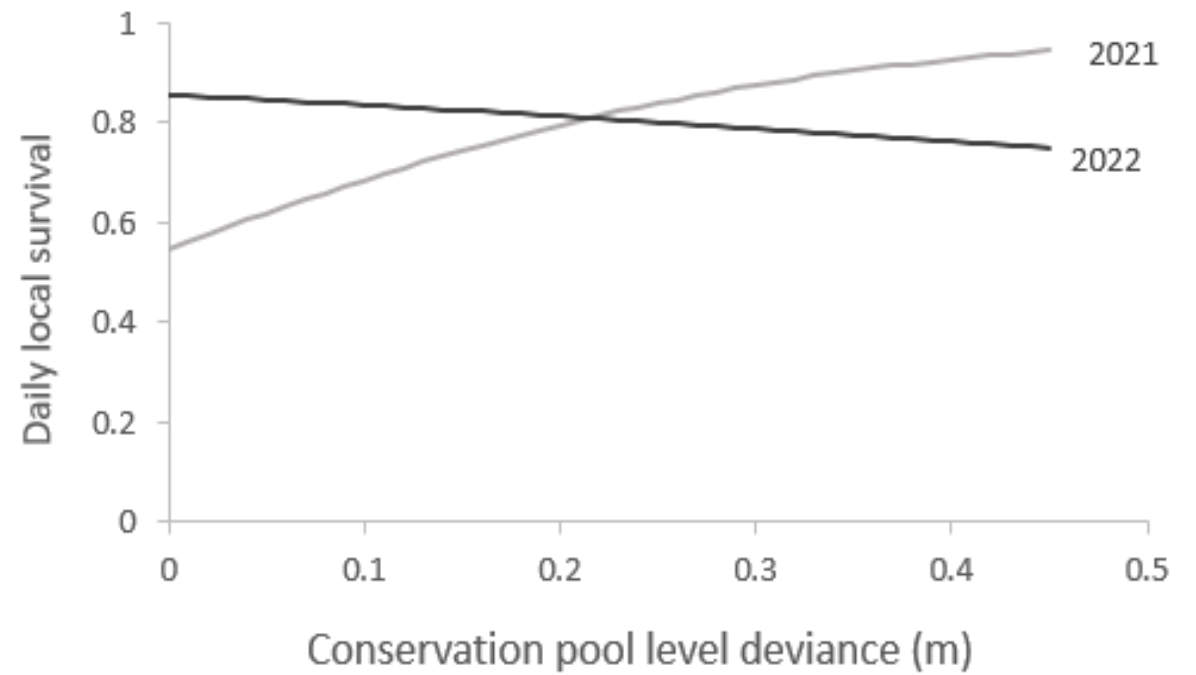
(2021) 0.52 to 0.94

(2022) 0.75 to 0.86

Adult



Juvenile



Adult and juvenile Least Sandpiper daily local survival probability given elevation deviance (m; below) the conservation pool level on Red Rock Reservoir, IA 2021-2022.



## RESIDENCY TIME

- Estimated residency time (2021)
  - 10.5 days (~95% CI = 7.7, 14.3)
- Estimated residency time (2022)
  - 6.1 days (~95% CI = 4.6, 8.0)

# DISCUSSION

- LESA was an ideal species for this study – long-distance migrant, easy to capture, previously studied in central Iowa
- Our estimates are (body condition) and are not (estimated residency time) comparable of those from a similar study at Saylorville Reservoir
- This information is critical for understanding site use by a migratory bird

# FUTURE WORK

- Tagging efforts will continue in 2023 and 2024
- On-going data analyses will explore relationships between stopover duration and explanatory variables (pool level, season, body condition, etc.)
- Waterbird surveys, stopover ecology, and vegetation data results will be combined to assess overall wildlife use and benefits of SRP water management





# ACKNOWLEDGMENTS

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QUESTIONS?

