MOVEMENT PATTERNS OF POST-FLEDGING SNAIL KITES IMPROVE UNDERSTANDING OF A KEY BOTTLENECK IN RECOVERY OF THE SPECIES

Caroline Poli
Robert Fletcher
Ken Meyer
Phil Darby

Recovery and Management

May require a species-specific approach

One strategy: focus on demography

- reproduction
- survival

Target the most important parameters

Complimentary data sources

Recovery and management: Snail Kites

Endangered raptor

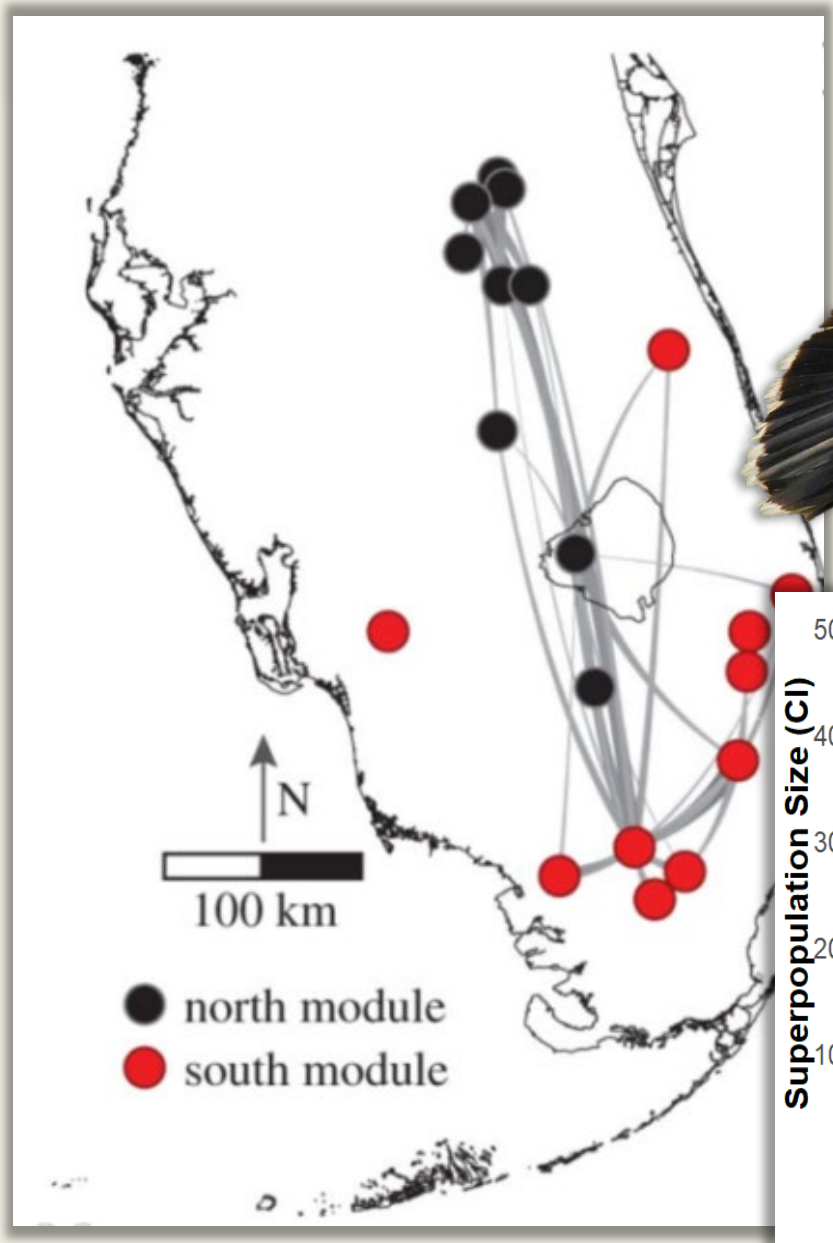
Extreme dietary specialist

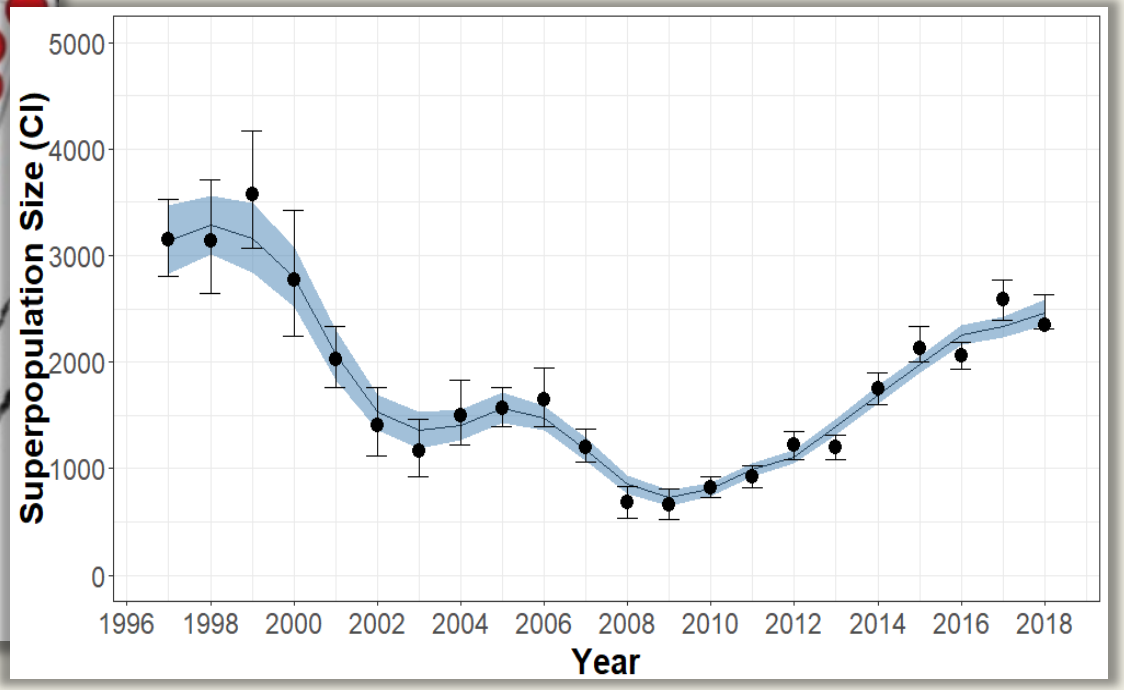
- freshwater apple snail (*Pomacea sp.*)

Wetland dependent

- closely tied to hydrology and water management

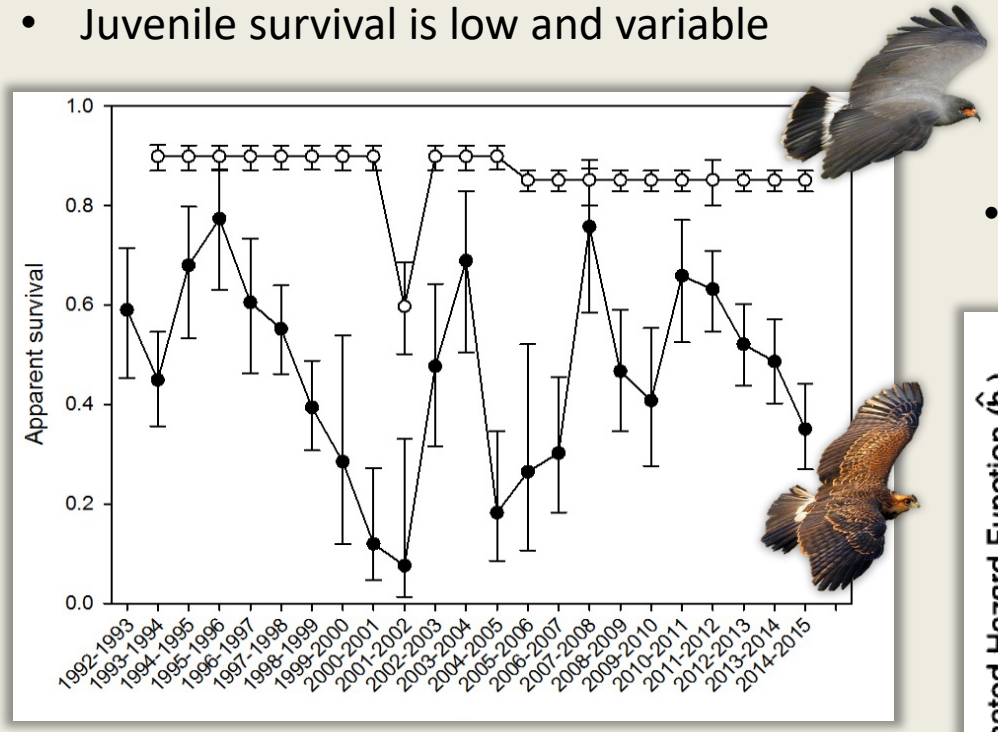
Monitoring the endangered Snail Kite



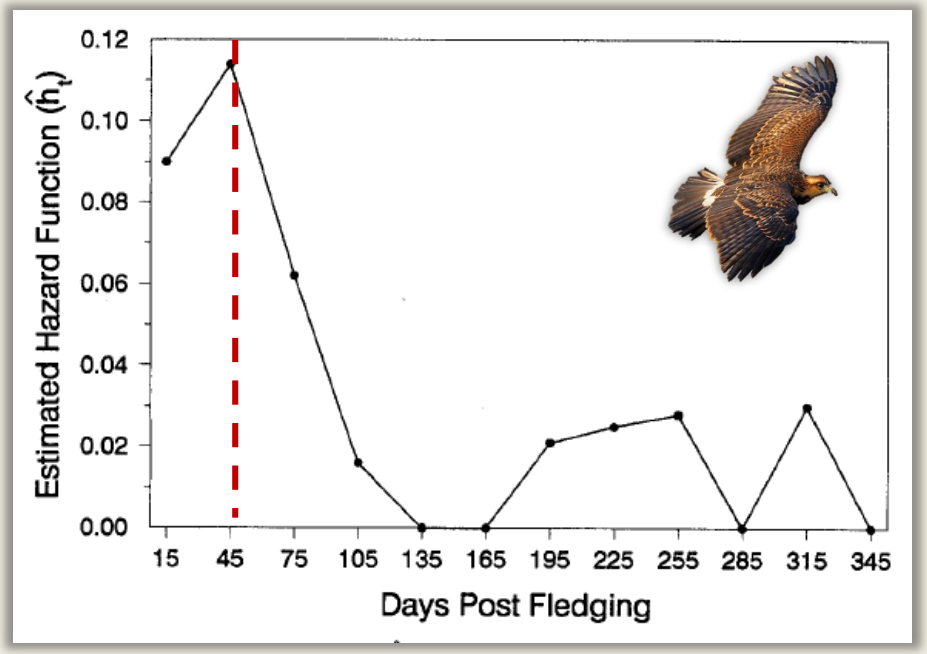


Issues in recovery: juvenile movements & survival

- Juvenile survival is low and variable



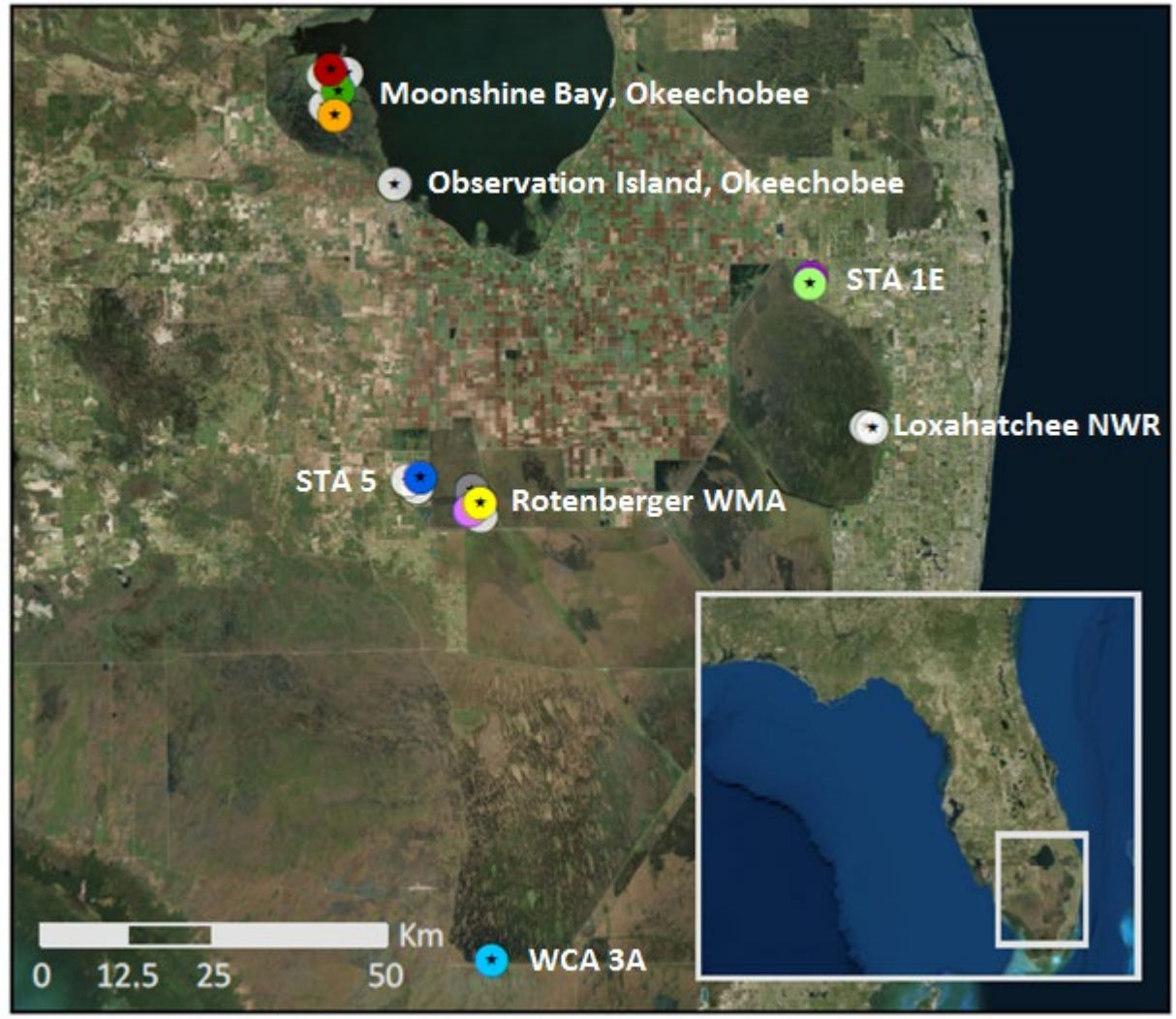
- Young birds are most likely to die within 100 days of fledging



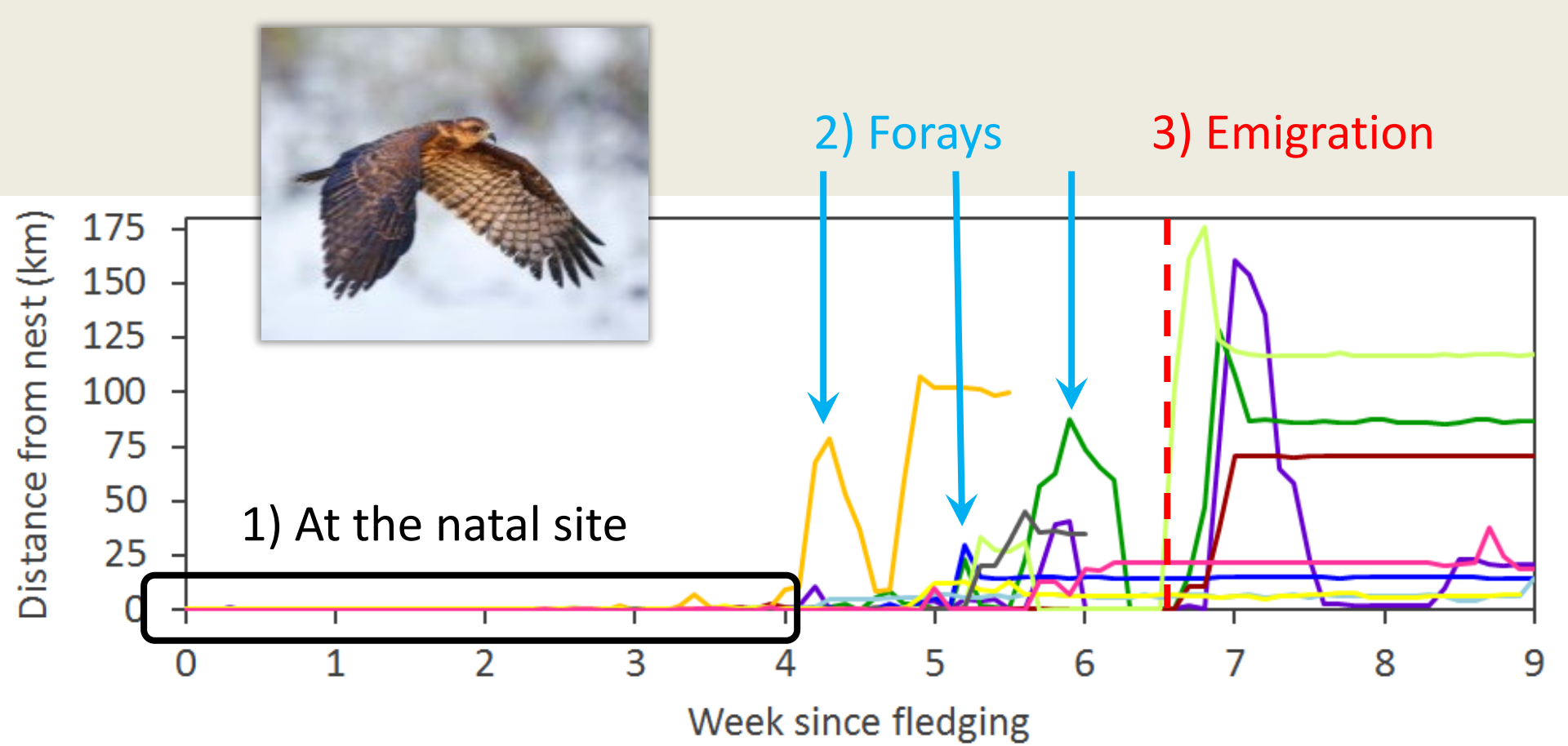
Conservation and management guidelines for promoting first-year survival remain limited

First-year movements, prey, and hydrology

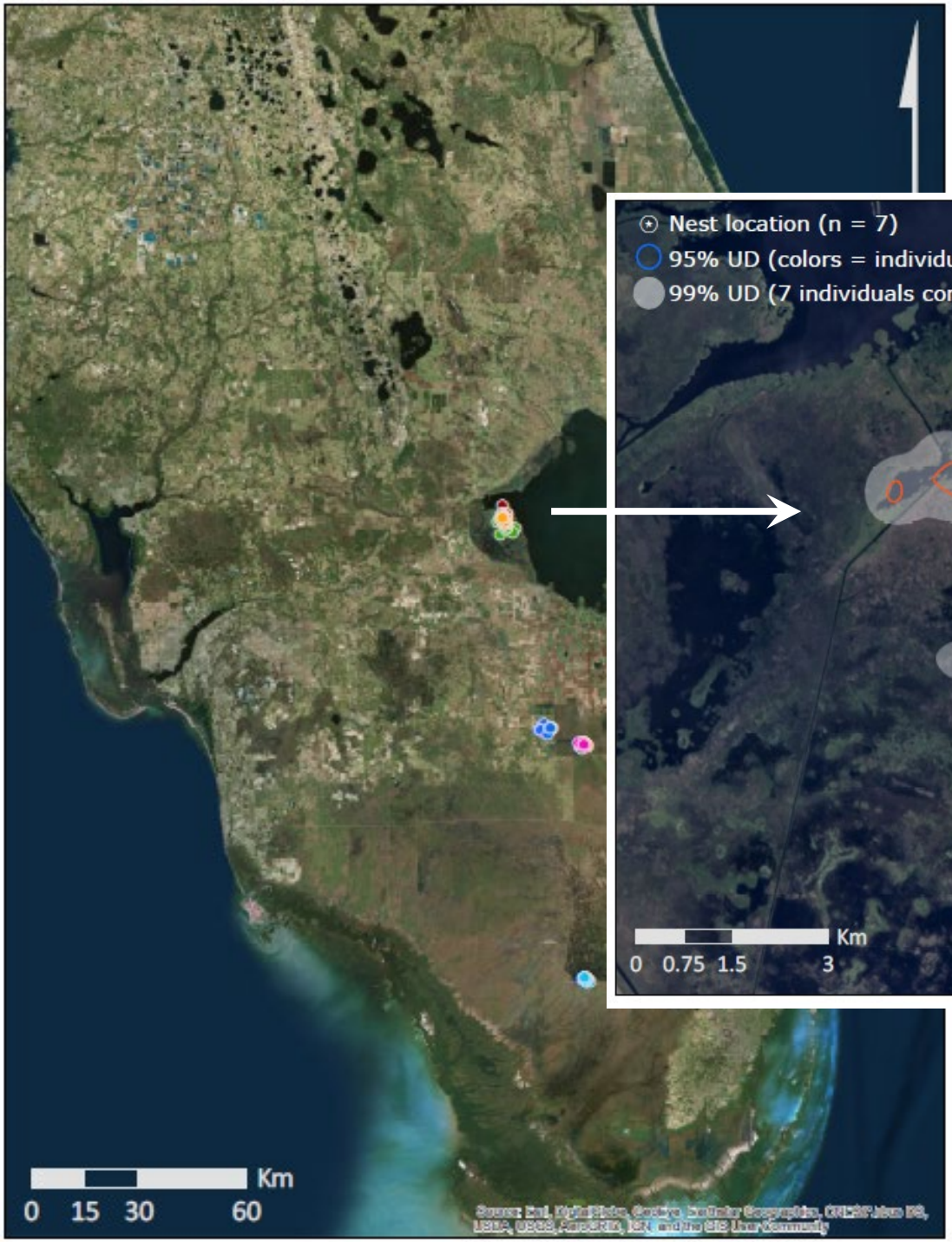
FIELDWORK

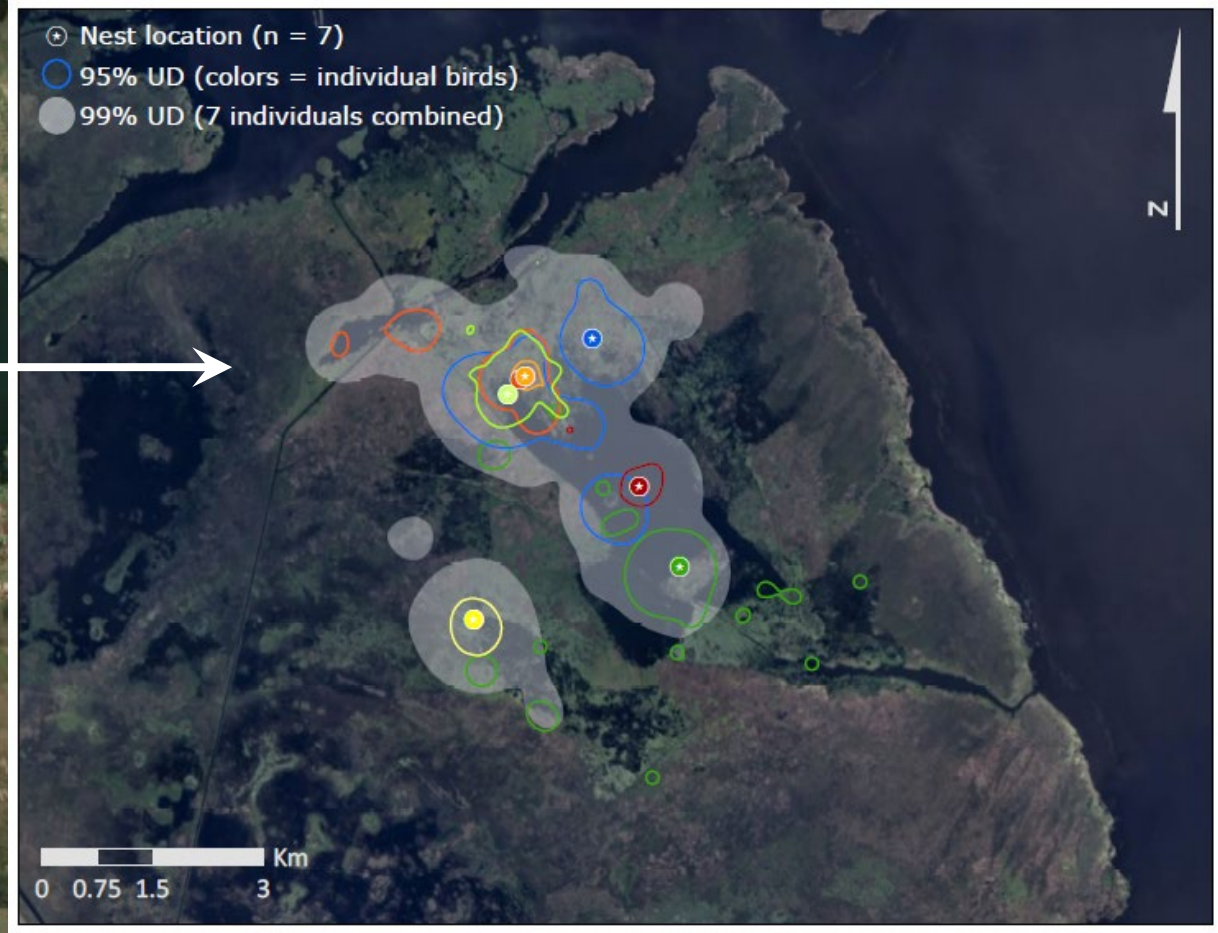


Tag	Supplier	Weight	Accuracy	Life
GPS/GSM	Ecotone	17g	10-30m	1-3 years

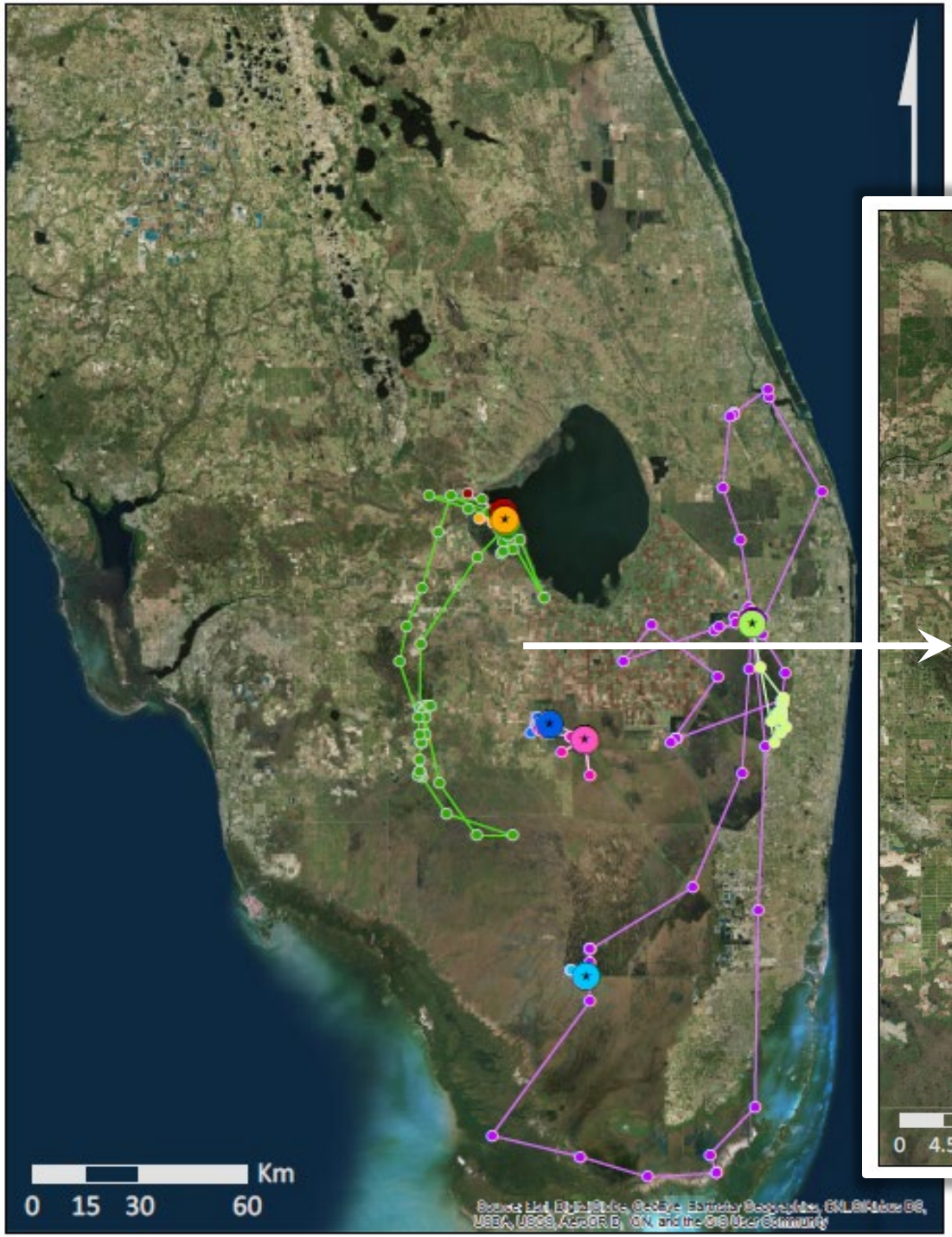

2) Forays
3) Emigration
1) At the natal site
Distance from nest (km)
175
150
125
100
75
50
25
0
0
1
2
3
4
5
6
7
8
9
Week since fledging

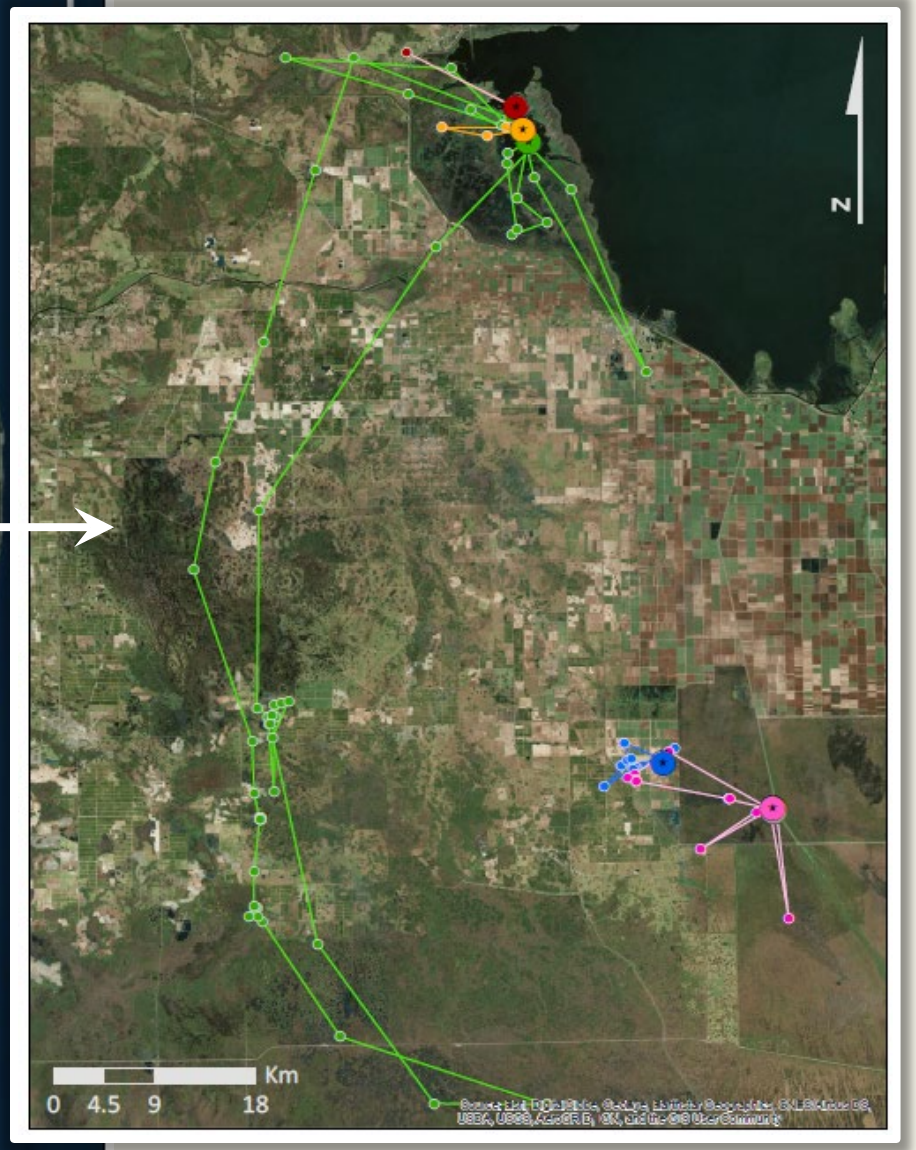
1) At the natal site: week 0 - week 8.5



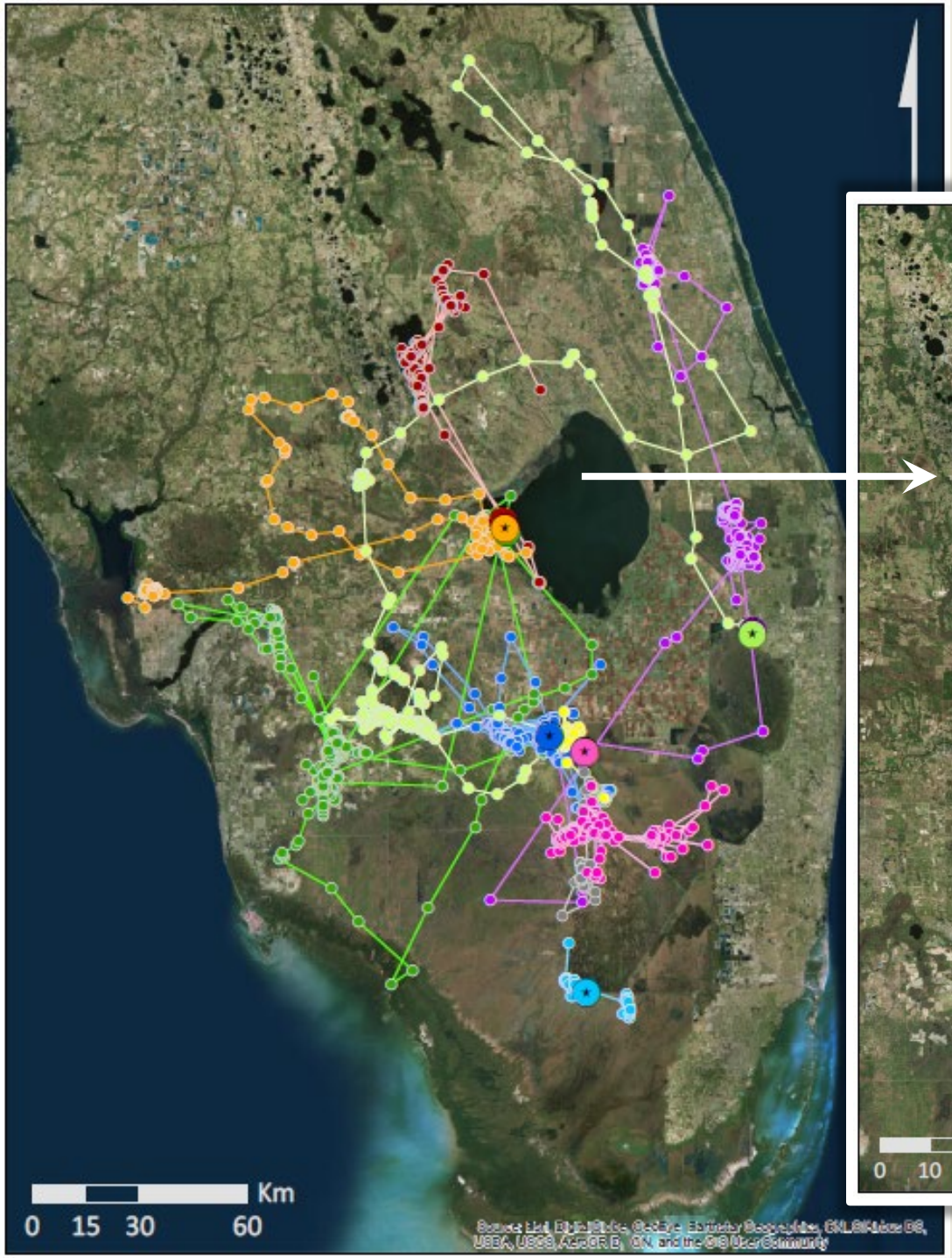


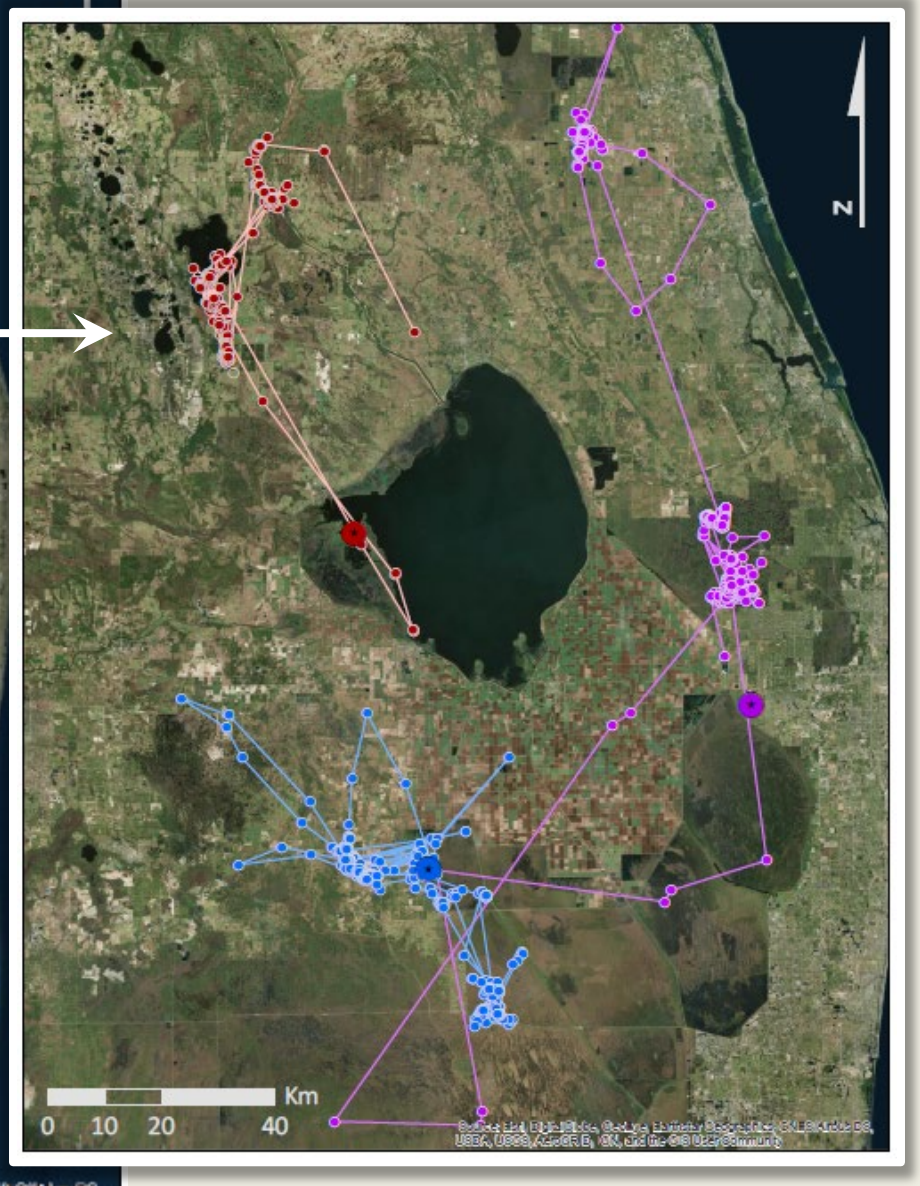
2) Forays:
week 4 - week 8.5





3) Emigration - 1 yr: week 4 - 1 yr or 4/1/18





Do prey and hydrology drive movement?

Movement behavior

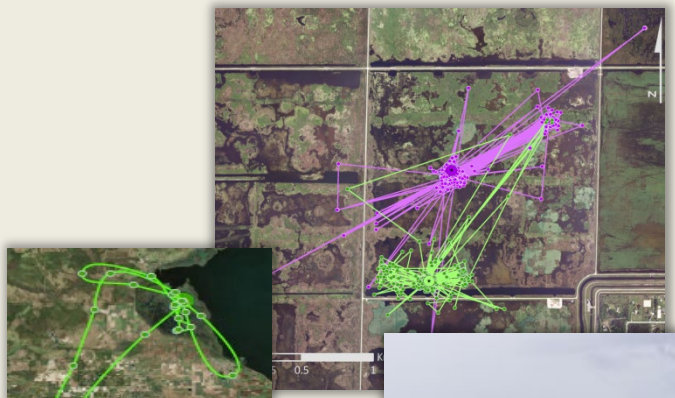
1) **At the natal site**
   - days near nest
   - range near nest
2) **Forays**
   - distance traveled in forays
   - time spent in forays
   - number of forays
3) Emigration - 1 yr

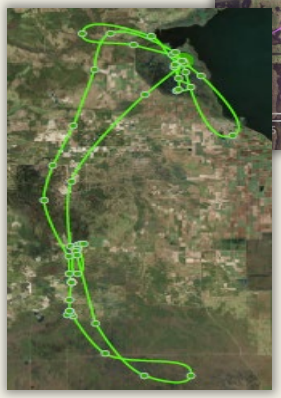
Snail density

- within 30 days of fledging at the nest

Hydrology at fledging

- depth
- Δdepth





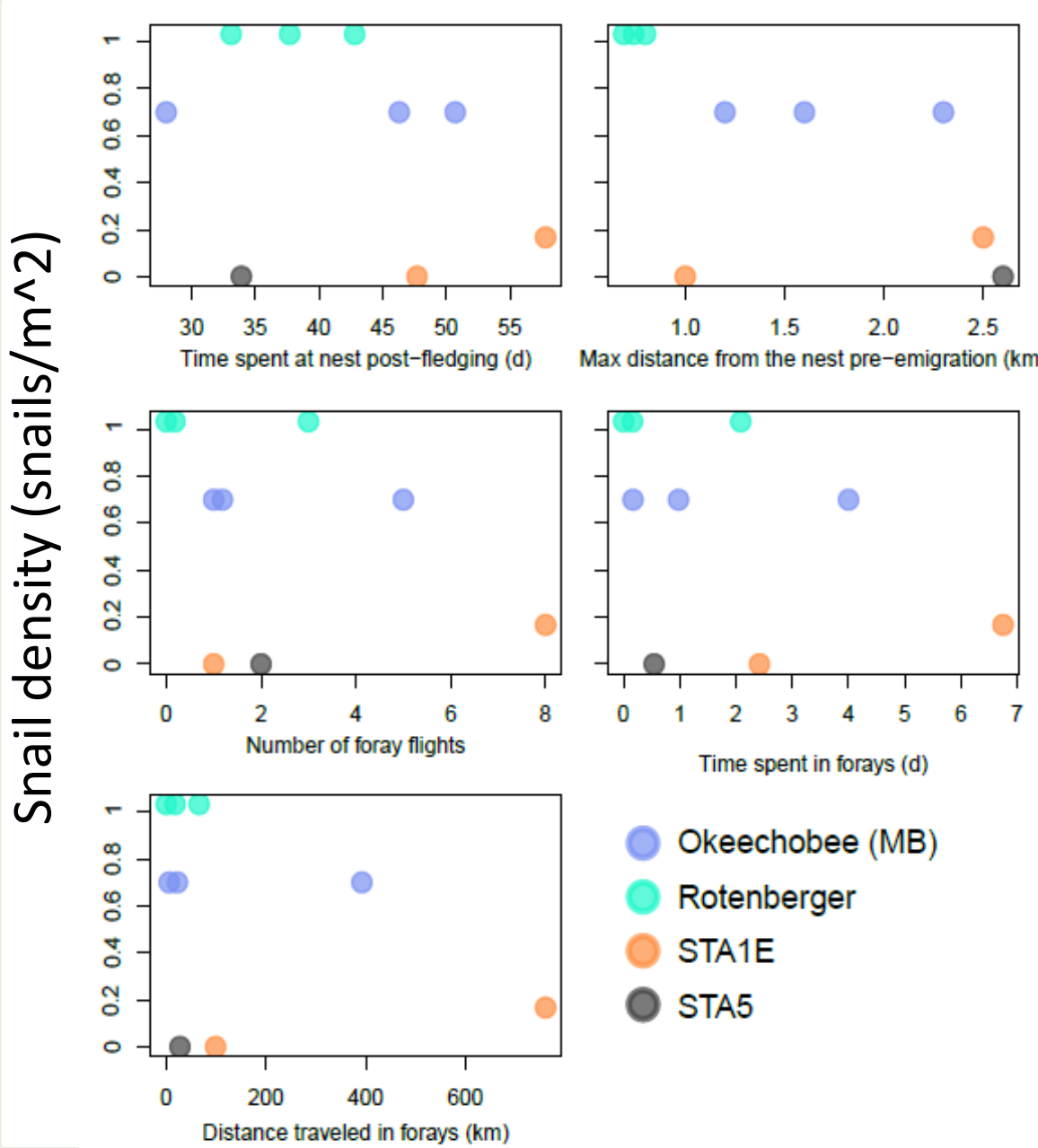
Prey and movement

1) At the natal site

2) Forays only

n = 9 birds

p ≥ 0.07 for all



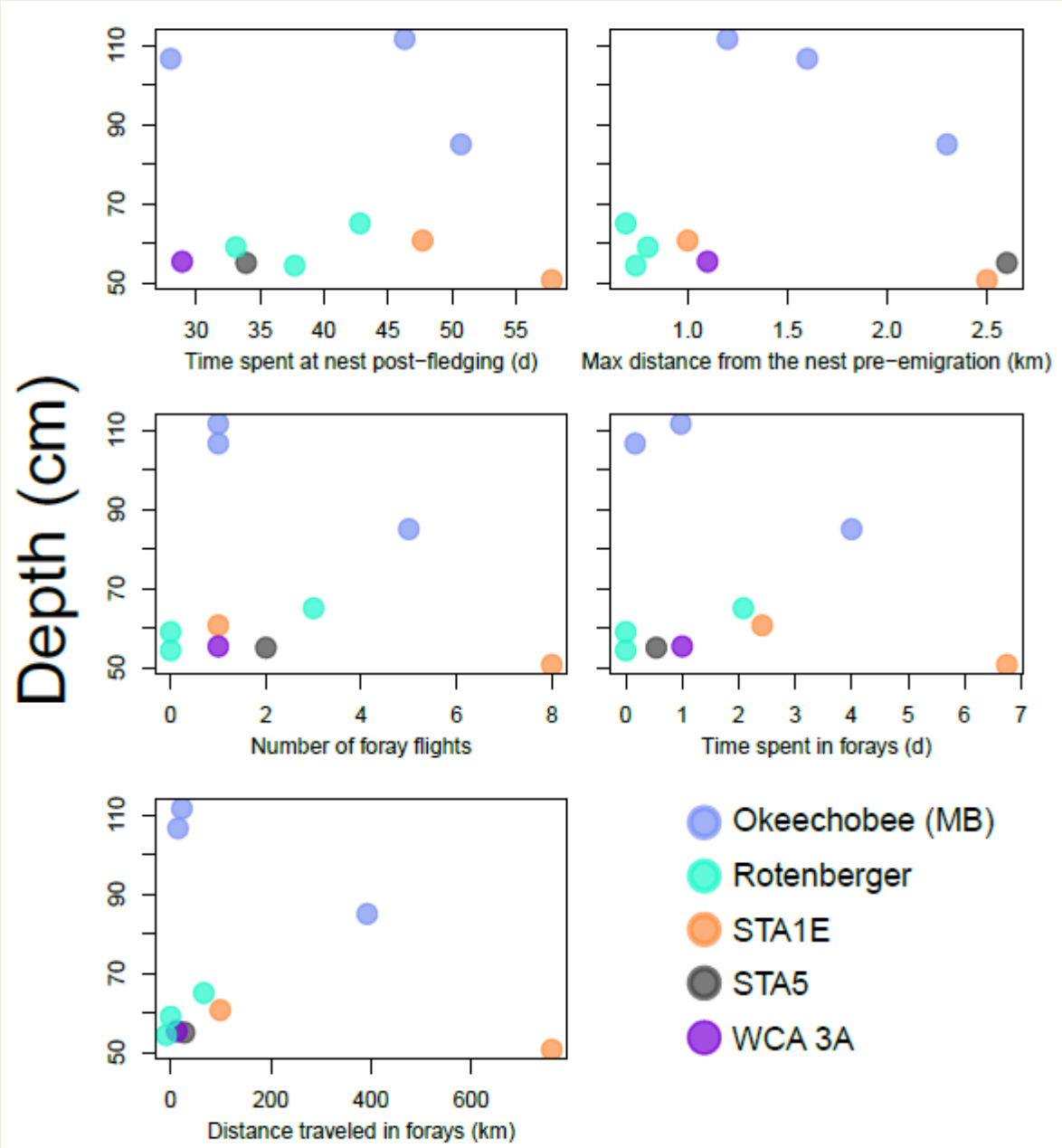
Hydrology and movement

1) At the natal site

2) Forays only

n = 10 birds

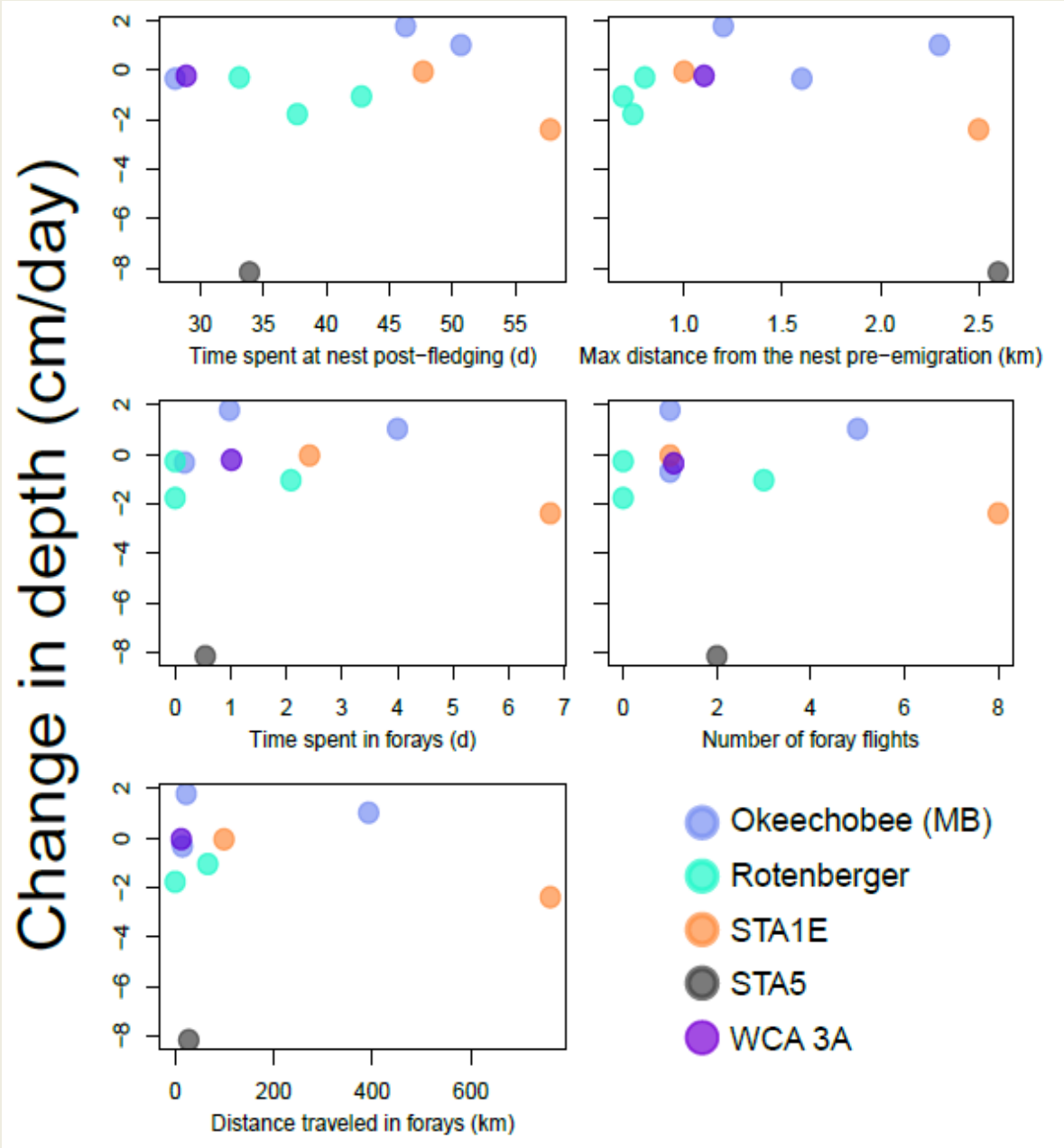
p ≥ 0.15 for all



Hydrology and movement

1) At the natal site

2) Forays only



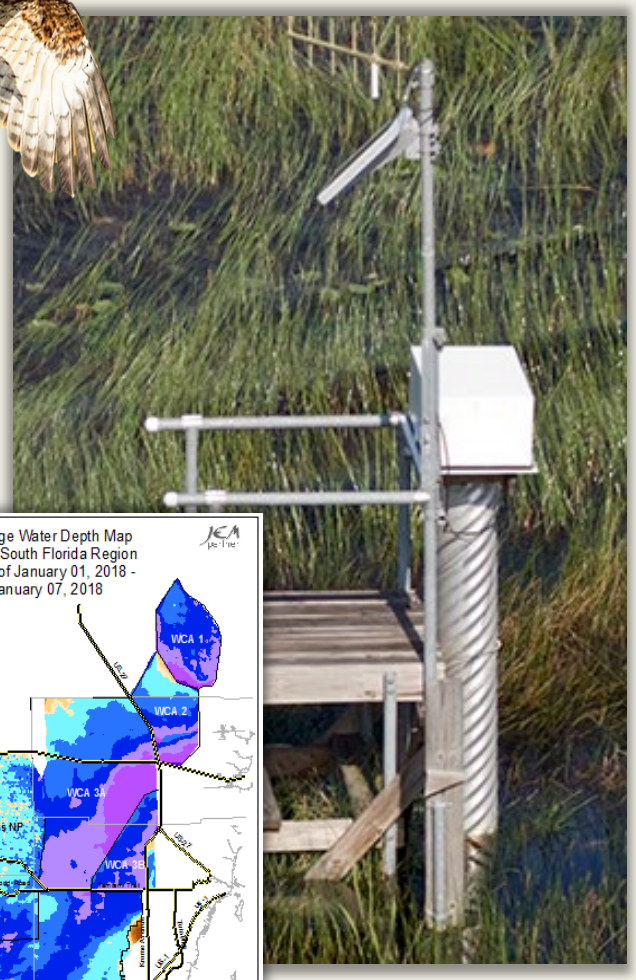
n = 10 birds

p ≥ 0.15 for all

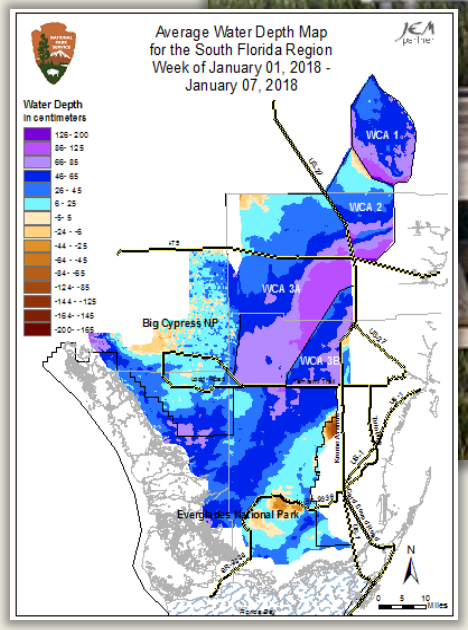
Expanding the scope: 1st-year survival and hydrology

use movement information to make decisions regarding spatial and temporal scale

First-year survival and hydrology



- Capture-mark-recapture models
- 1996-2018, 6 EDEN sites, 911 birds
- EDEN Gauge data:
  - water depth, 7-day and 14-day recession within 30 days of fledging at 1km from the nest



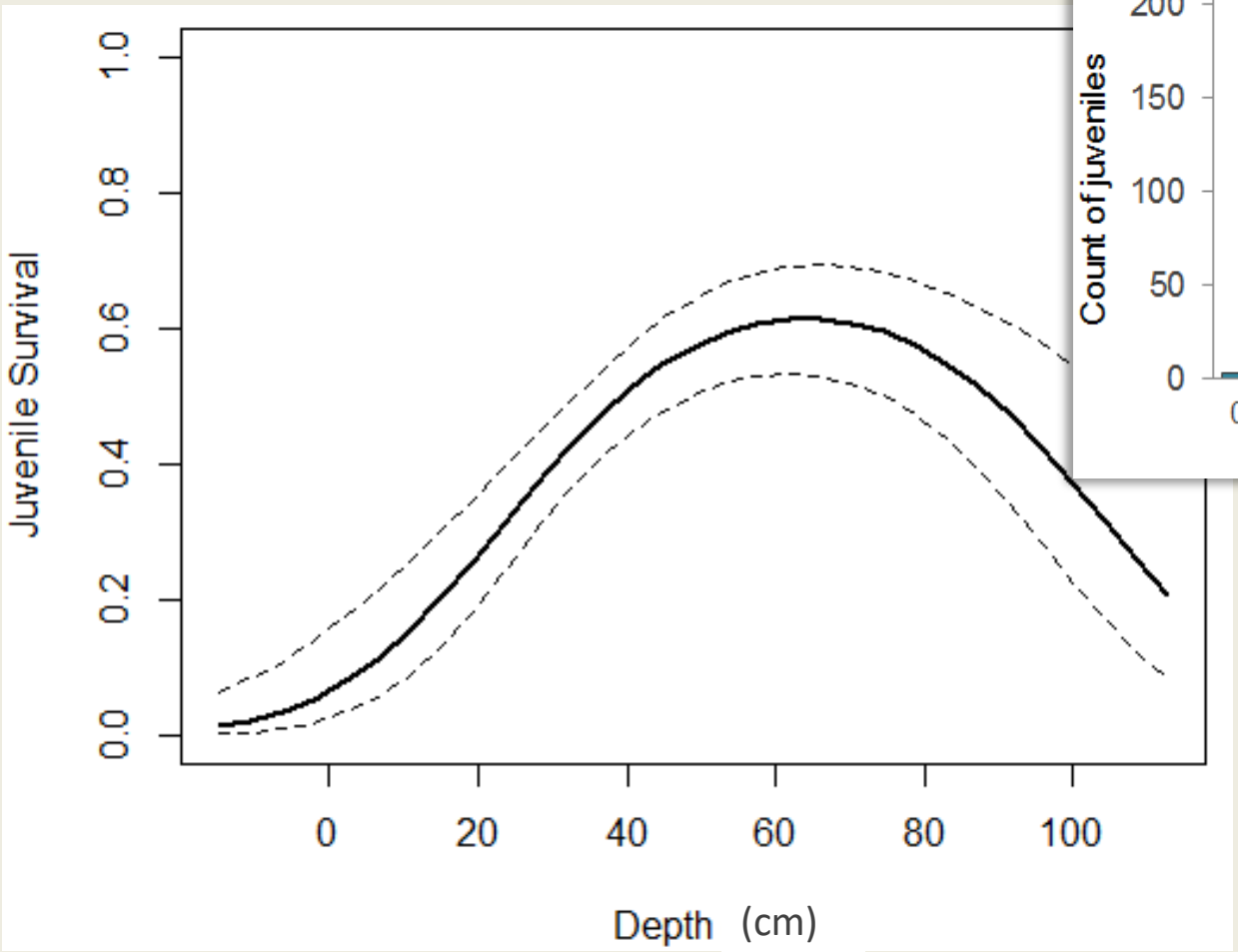
Apparent Survival (Phi)

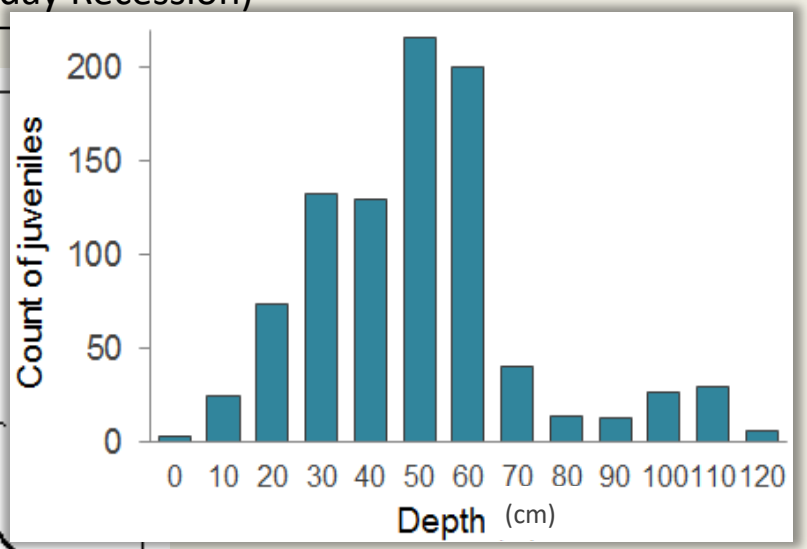
JUV (Mean Stage + Mean Stage ^{2})

JUV (Mean Stage + Mean Stage ^{2}) + Area

JUV (Mean Stage) + Area

JUV (Mean Stage + Mean Stage ^{2}) + JUV (Max 14-day Recession)





- More work is needed to understand movement
  - Incorporate information from more birds as it becomes available
  - Consider gauge data
  - Investigate additional measures of movement at different scales

- Hydrology explains 1st-year survival
  - Incorporate northern section of range
  - Continue to gather tracking information to improve understanding of movements, prey, and hydrology

Acknowledgments

Monitoring design and implementation:
Wiley Kitchens, Rob Bennetts, Vicky Dreitz, Don DeAngelis, James Nichols, Bill Kendall, Jim Hines, FL Coop Unit

Funding:
USGS, U.S. Army Corps, Florida Fish & Wildlife Conservation Commission, USFWS, St. John's Water Management District, South Florida Water Management District