Using GPS telemetry to document foraging dynamics of the American Oystercatcher in North Carolina

Kate Goodenough[1,2], Lindsay Addison[3]

[1]Biology Department, University of Oklahoma, OK

[2]Oklahoma Biological Survey, University of Oklahoma, OK

[3]Audubon North Carolina, Wilmington, NC

OKLAHOMA BIOLOGICAL SURVEY
The UNIVERSITY of OKLAHOMA

Acknowledgements

Partners in research

- Becky Harrison, Brian Van Druten- Pea Island National Wildlife Refuge
- Jon Altman- Cape Lookout National Seashore

Funding sources:

- National Science Foundation
- Corix Plains Institute, University of Oklahoma
- Oklahoma Biological Survey, University of Oklahoma
- Audubon North Carolina
- Carolina Bird Club, Craig Watson

Background: What we know about AMOY nesting habitat use and foraging ecology?

- Nesting habitats are high variable ranging from barrier island beaches, natural islands, marsh, and dredge-material islands
- Shellfish specialists that are influenced by the tidal cycle although there is a range of prey across latitudes
- EUOY movement research documented EUOY nocturnally foraging at lower tides

Jean Hall

Why is there a need to look more closely? What will the fine scale data tell us?

Nocturnal foraging dynamics during reproduction are relatively unknown.

Question: Are there differences in foraging strategies for AMOY nesting in different habitats?

Photo by Jean Hall

Tidal cycle influences?

Sex-related variation in forage ground use?

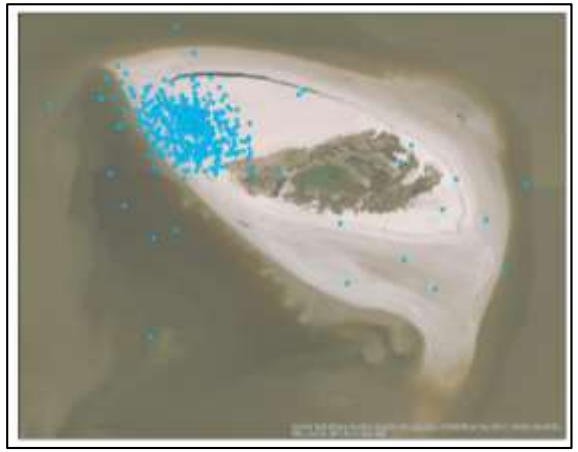
Temporal differences in foraging activities (day vs night)?

Spatial variation in use of foraging grounds?

Study Design

Three habitat types: barrier island, dredge-material, or natural island

Foraging ground adjacent to nesting territory or not



Project Methods

GPS telemetry

- Deployed 28 solar-powered GPS dataloggers
- 30 and 60 min data collection

Movement analyses

- R packages ‘move’ (Kranstauber et al. 2019) and ‘amt’ (Signeur er al. 2022)

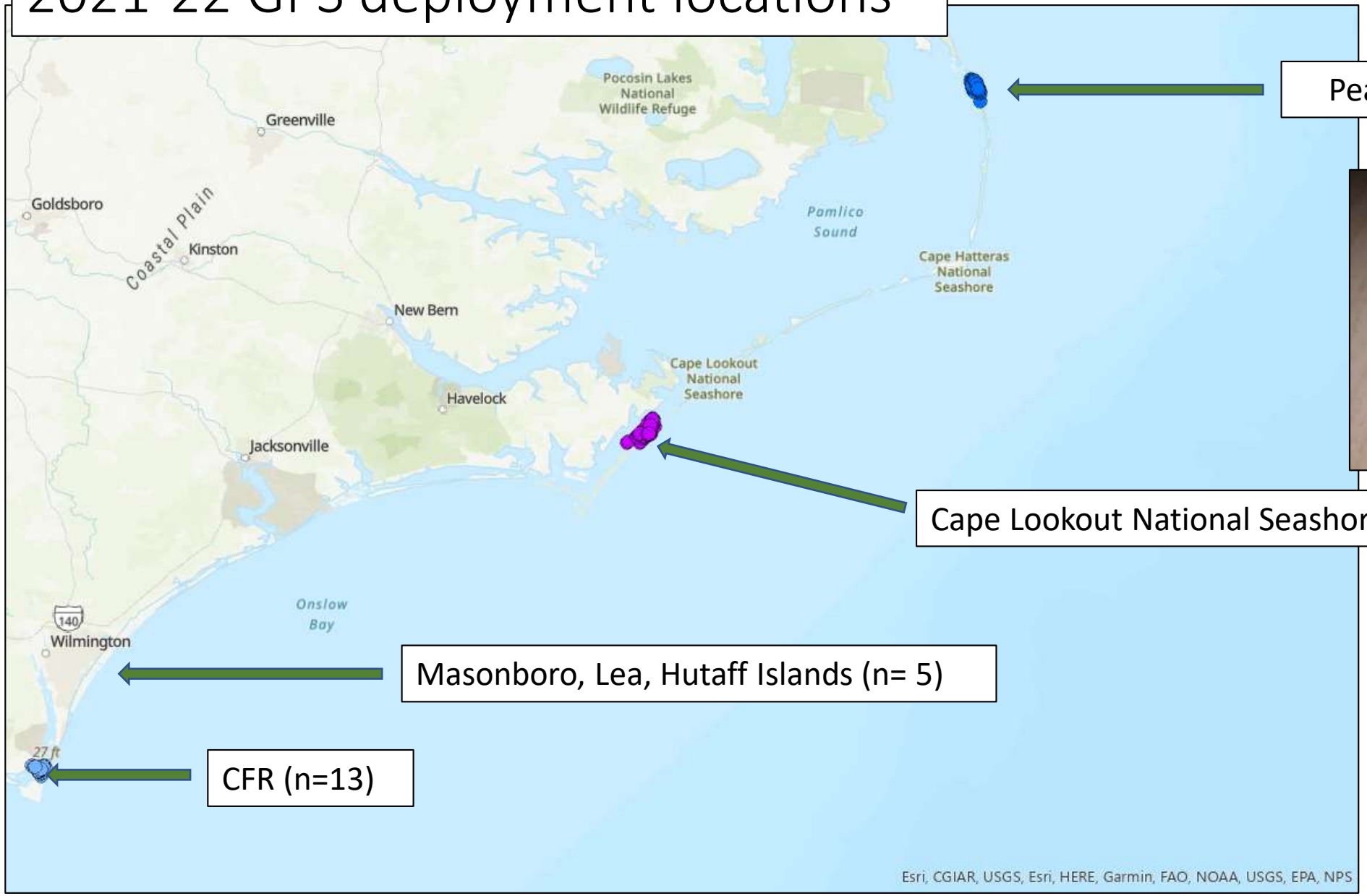
GIS techniques

- ArcGIS Pro 2.9 for map-making

Statistical analyses

- Mixed effects modeling
- kde for home ranges

2021-22 GPS deployment locations



Pea Island NWR (n=4)

Cape Lookout National Seashore (n=6)

Masonboro, Lea, Hutaff Islands (n= 5)

CFR (n=13)

- 7.5g solar-powered GPS dataloggers with UHF download (n=29)
- Tags programmed to collect locations data every 30-60 minutes throughout the breeding season.

Results: Spatio-temporal aspects of foraging

Photo by Jean Hall

Tidal cycle influences?

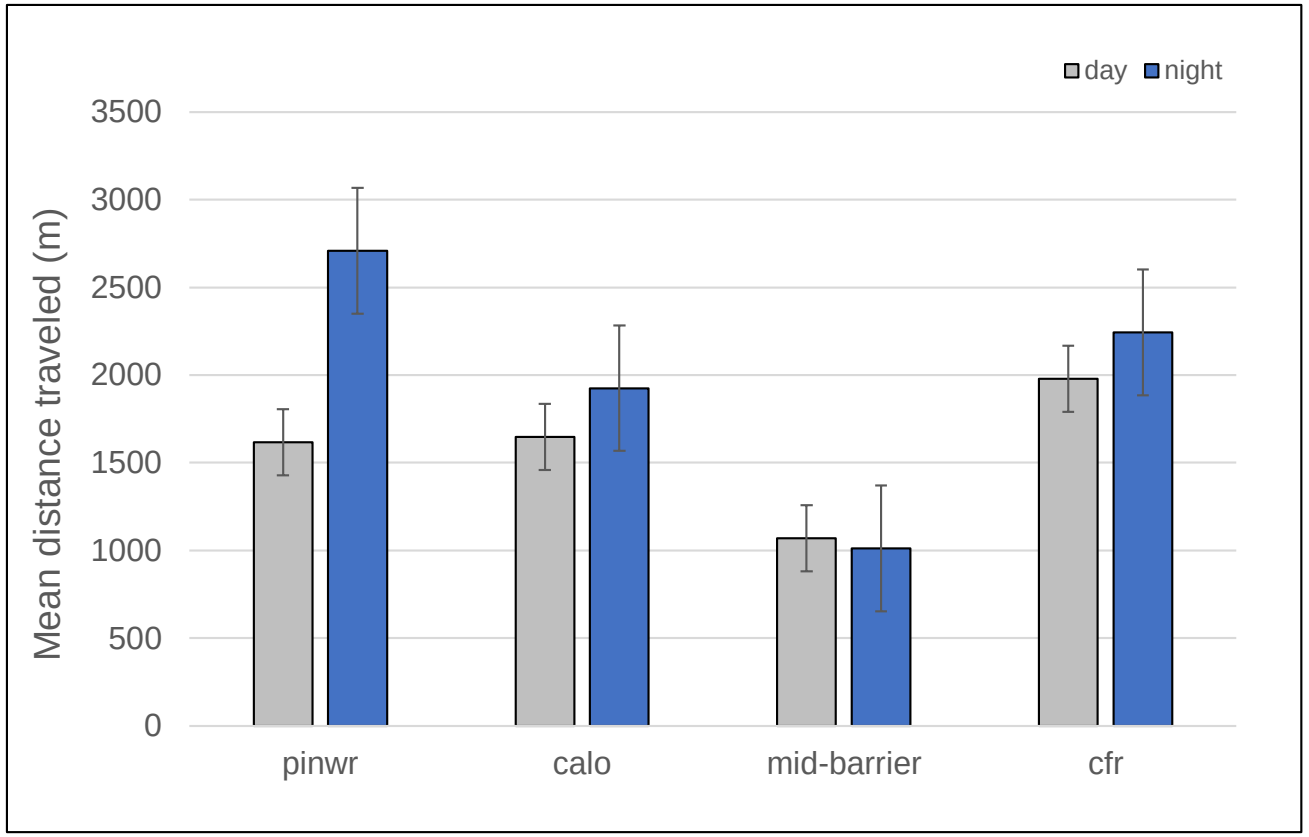
Sex-related influences?

Temporal differences in foraging (day vs night)?

Spatial variation in foraging strategies?

Results: Day vs night foraging

Forage trip distance = distance from location to nesting territory



n = 1,769 forage trips

- PINWR birds traveled the farthest for foraging opportunities (max = 10.9km)
- PINWR birds traveled farther at night (1.6 vs 2.0 km)
- Mid-barrier island birds traveled the least (max = 2.3km)
- 96% of mid-barrier island movements were < 1.0 km)
- Night movements very common and an important aspect of AMOY foraging ecology

Day = 0600 to 2030 EST
Night = 2100 to 0530 EST

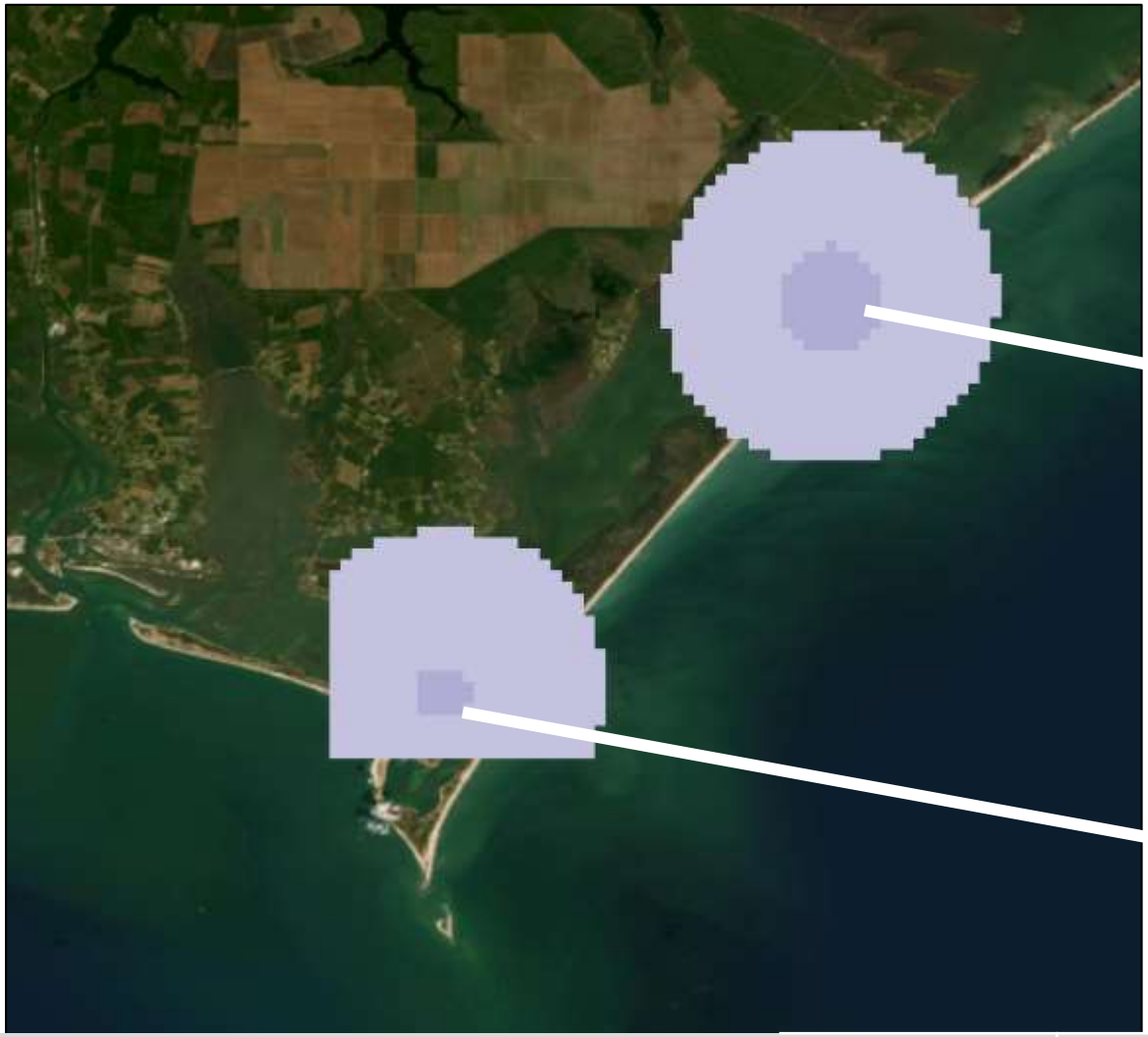
PINWR kernel density of foraging areas

	Day (m)	Night (m)
C0Y*	1114 ± 765	1086 ± 275
C3P	1187 ± 456	0
EE8	941 ± 49	4542 ± 2551

CFR kernel density of foraging areas

	Day (m)	Night (m)
Dredge Island	2264 ± 1186	2239 ± 509
Natural Island	812 ± 771	2830 ± 2071

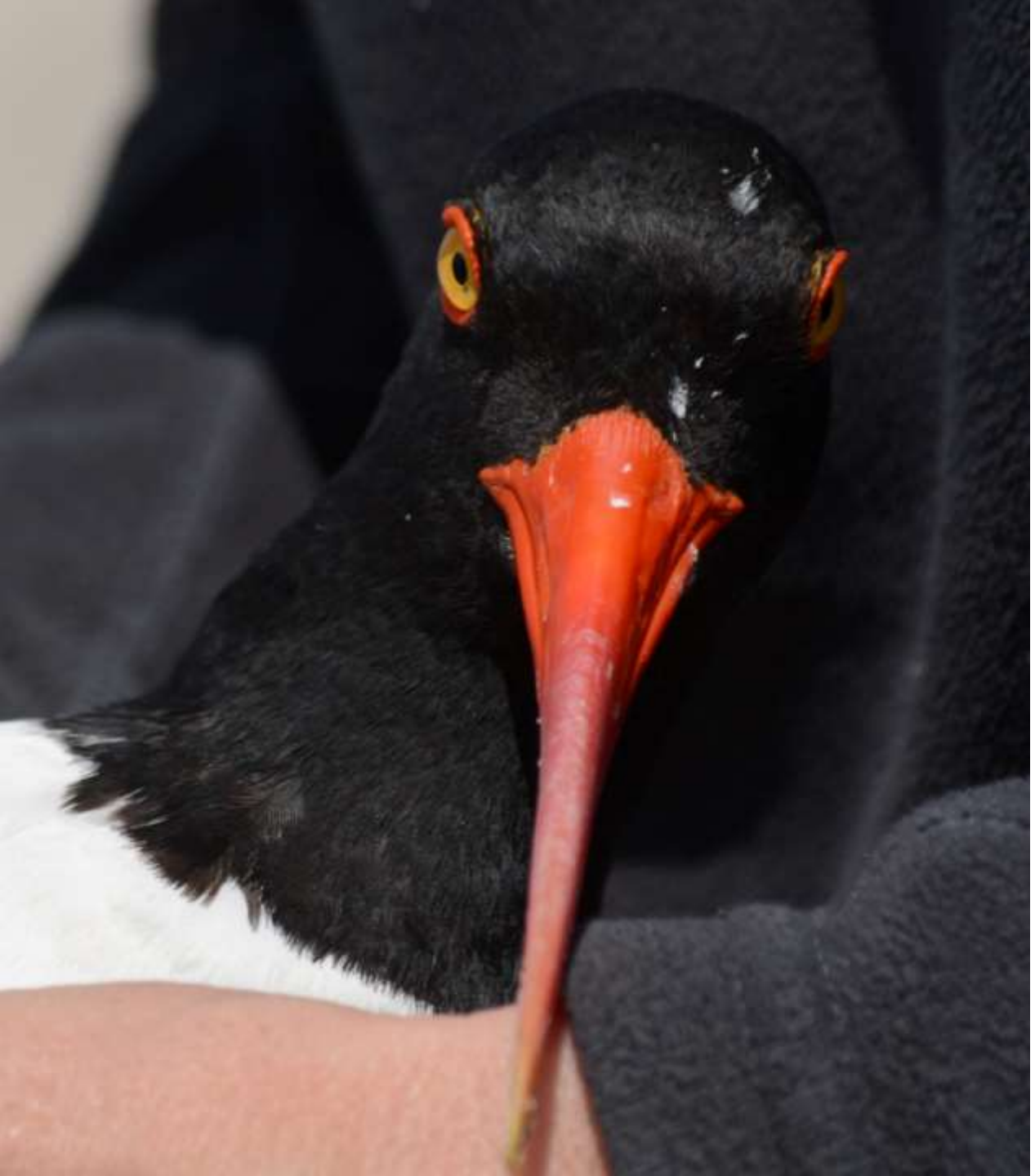
CALO kernel density of foraging areas



	Day (m)	Night (m)
EMM (Morgan Island)	335 ± 545	275 ± 195
EMN (S Core Banks)*	1637 ± 613	2014 ± 818
EMP (S Core Banks)	2751 ± 1704	3637 ± 1876

Conclusions- TBD

- Night foraging is an important part of the foraging ecology of AMOY in North Carolina comprising up to a 3rd of daily foraging trips
- Quite a bit of individual heterogeneity!
- Shared foraging areas for dredged-material and natural islands in the CFR



Questions??