# BEeS

## The LifeWatch ERIC Biodiversity & Ecosystem eScience Conference

Seville
22-24/05/23

Threats and challenges to biodiversity and ecosystem conservation from an eScience perspective

LifeWatch ERIC

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Estación Biológica Doñana CSIC

Javier Bustamante

# Do resident Lesser Kestrels forage over larger areas than migratory individuals during the non-breeding season?

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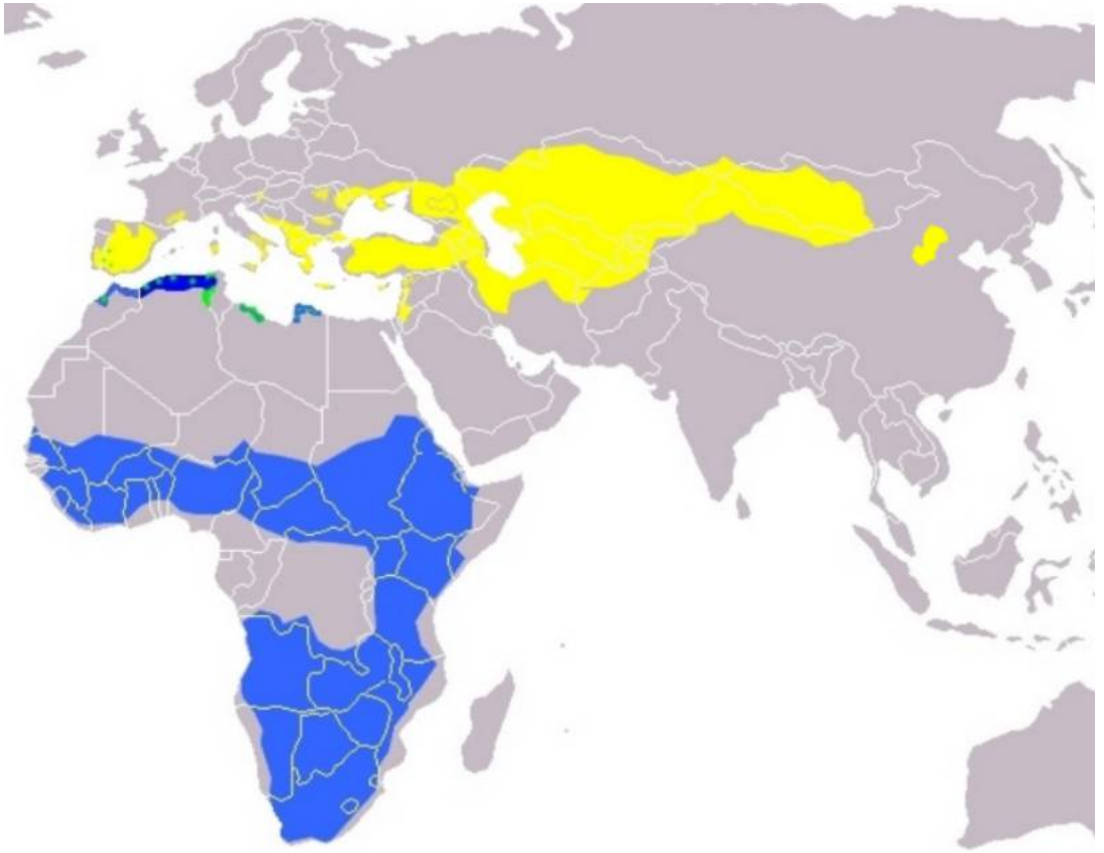
# Stating the problem

Lesser kestrel (*Falco naumanni*)
Colonial
Insectivorous
Migratory

Breeds: Europe – Asia
Winters: Africa

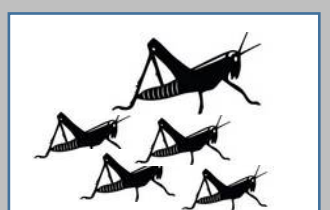


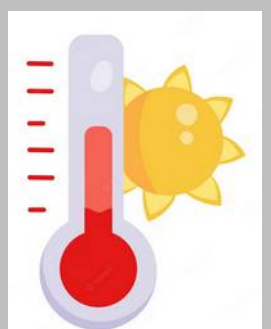
Some Lesser Kestrel populations
Partially migratory

Andalusia, Spain

RESIDENTS: < 25%
Stay close to breeding colonies

MIGRANTS:





## MIGRANTS: > 75%

3000-4000 km to Winter quarters
Crossing barriers (Mediterranean sea, Saharan desert)

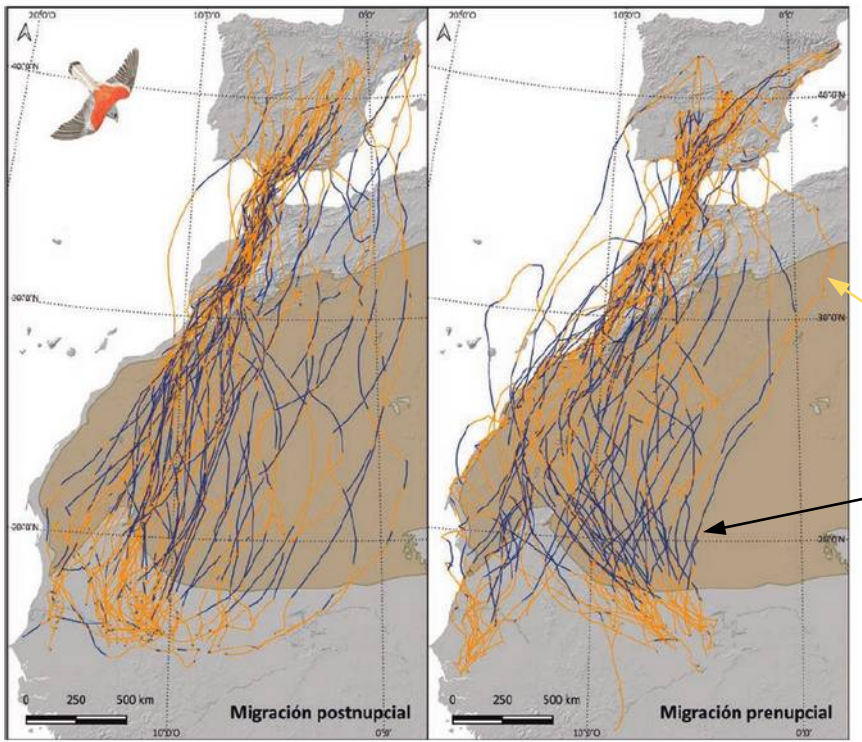



**Figura 11**
Viajes migratorios de cernícalos primilla sobrevolando zonas de barrera y no-barrera durante su migración. El panel de la izquierda muestra las trayectorias de migración postnupcial y el de la derecha las de migración prenupcial. Los colores indican la migración nocturna (segmentos azules) y la migración diurna (segmentos naranjas) al sobrevolar las zonas de no barreras (gris) y las barreras ecológicas (desierto = café, mar = blanco).

**Figure 11**
Migration trips of lesser kestrels flying over different barriers and non-barriers. Left panel shows post-breeding and right panel pre-breeding migration trips. Colours indicate nocturnal migration (blue segments) and diurnal migration (orange segments) when flying over non-barriers (grey) or barriers (desert = brown, sea = white).

Diurnal

Nocturnal

Desert
Sea

**Rutas migratorias**
Trayecto diurno
Trayecto nocturno

# Material and methods

57 migrants (several winters 2016-2022)
11 residents (one winter 2021)

GPS trackers (1 fix per hour)

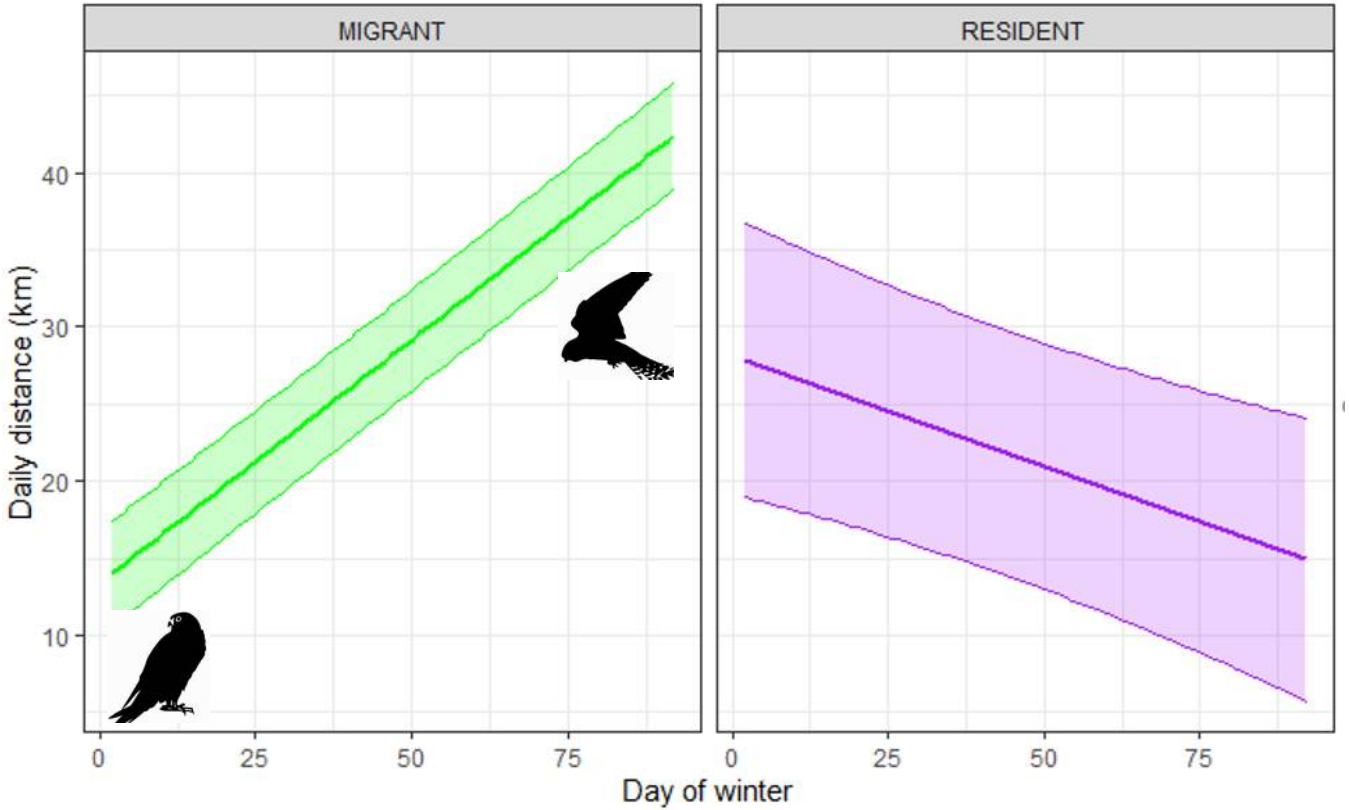
Variables. Daily Accumulated Distance
50% and 95% KDE weekly home ranges

GLMM to compare RESIDENTS vs MIGRANTS

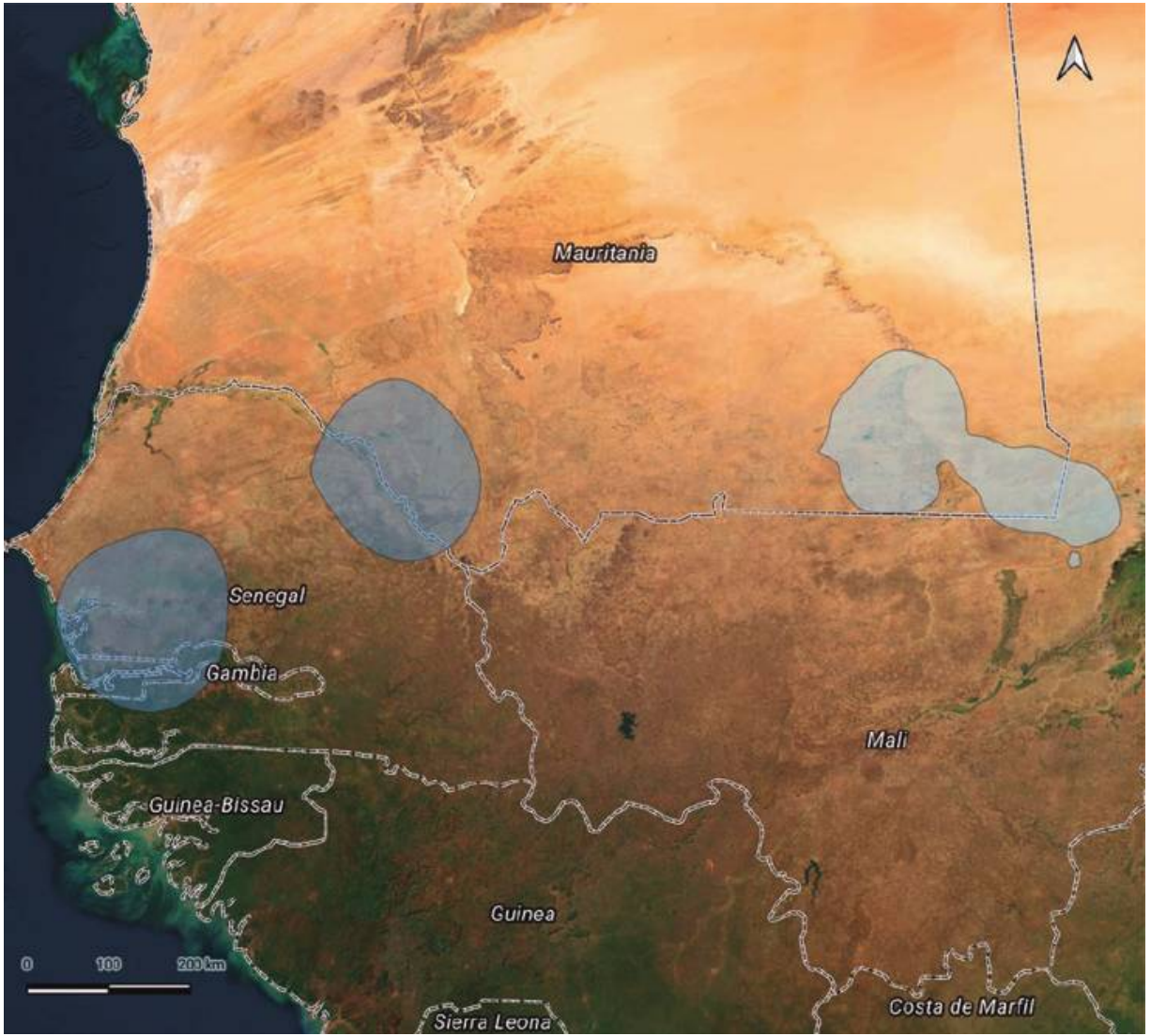
# Hypothesis

If the majority of lesser **kestrels risk a > 3000 km** migration crossing the Sahara desert and the Mediterranean sea instead of remaining at the breeding colonies, this must be compensated by **higher food abundance in the Sahel**. We expect that winter territories of migratory individuals will be on average smaller than those of residents and that migratory individuals may cover on average smaller daily accumulated distances to forage.

# Results




Migrant lesser kestrels start with low Daily Distances and increase it on average 0.315 km per day.
Resident lesser kestrels start with larger values and don't show a significative temporal trend




16687

16688

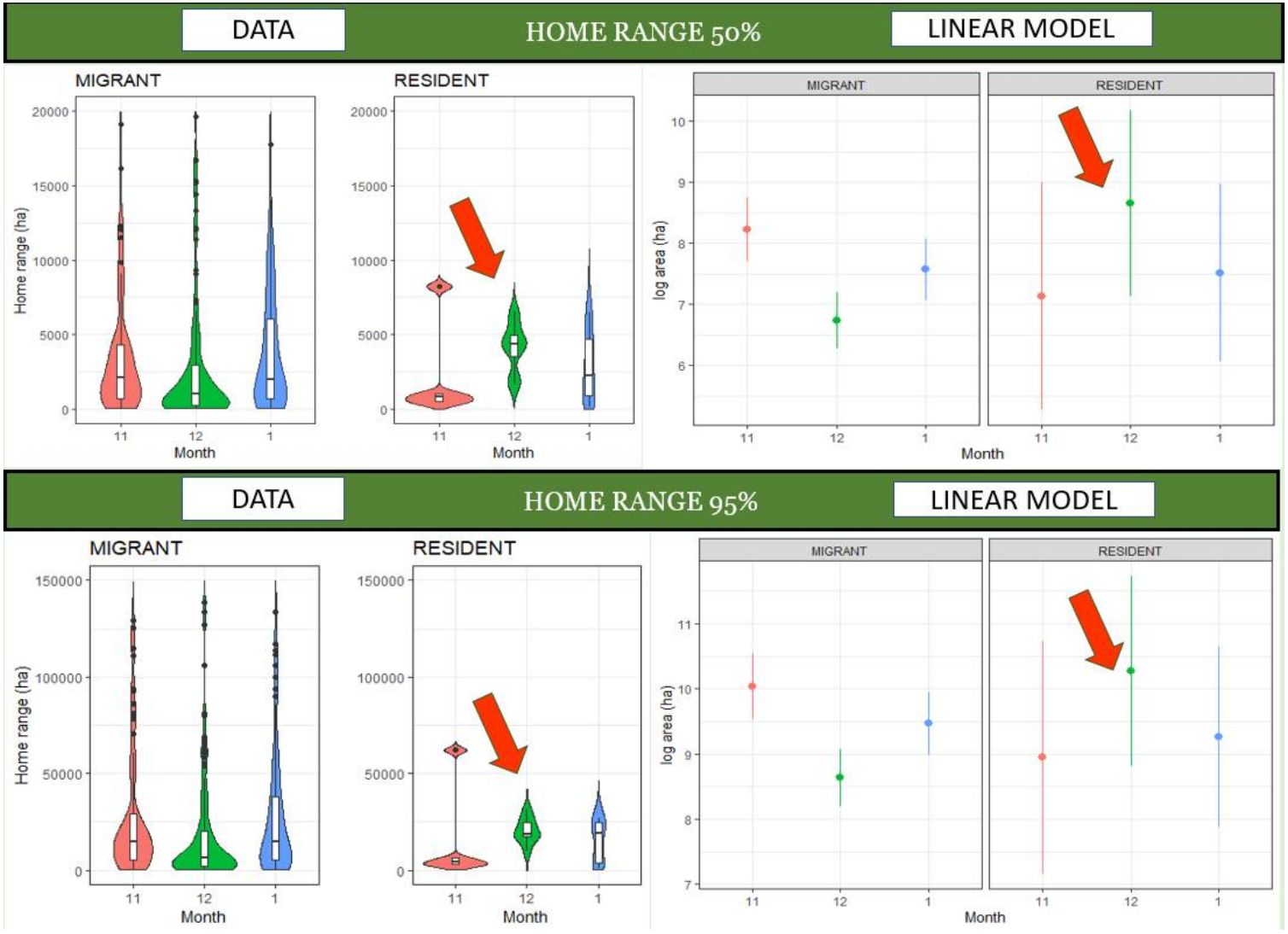
Fronteras

Bases: ESRI Satellite

# Results

50% & 95% Kernel Density Estimates (KDE) of weekly home ranges

**In December (red arrow), home ranges of residents are larger than those of trans-Saharan migrants.**



# Discussion

- Our hypothesis is partially supported. **Home ranges are significantly larger for resident vs. migrants in December**, but differences are not so clear at the beginning (November) or at the end of the wintering period (January).
- **Accumulated daily distances are significantly larger for residents vs migrants** during the first part of the wintering period. Migrants average values increase along the winter so there are no marked differences at the end. Residents show initially larger average values and no trend in accumulated daily distance.
- There are no significant differences between the sexes.
- Data on residents are mostly limited to a single winter, so more data would be needed to see if differences are consistent in different years.

# Acknowledgements

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Thank you! | www.lifewatch.eu/bees-2023