

## The challenge:

- Understanding **how animals adapt to climate change** is a conservation priority, but challenging, at least because:

1. the necessary **long-term animal behavior data sets are rare** and complex when available, and
2. studies are conducted at site- and population-specific levels, often at short temporal scales (i.e., 2-3 years).

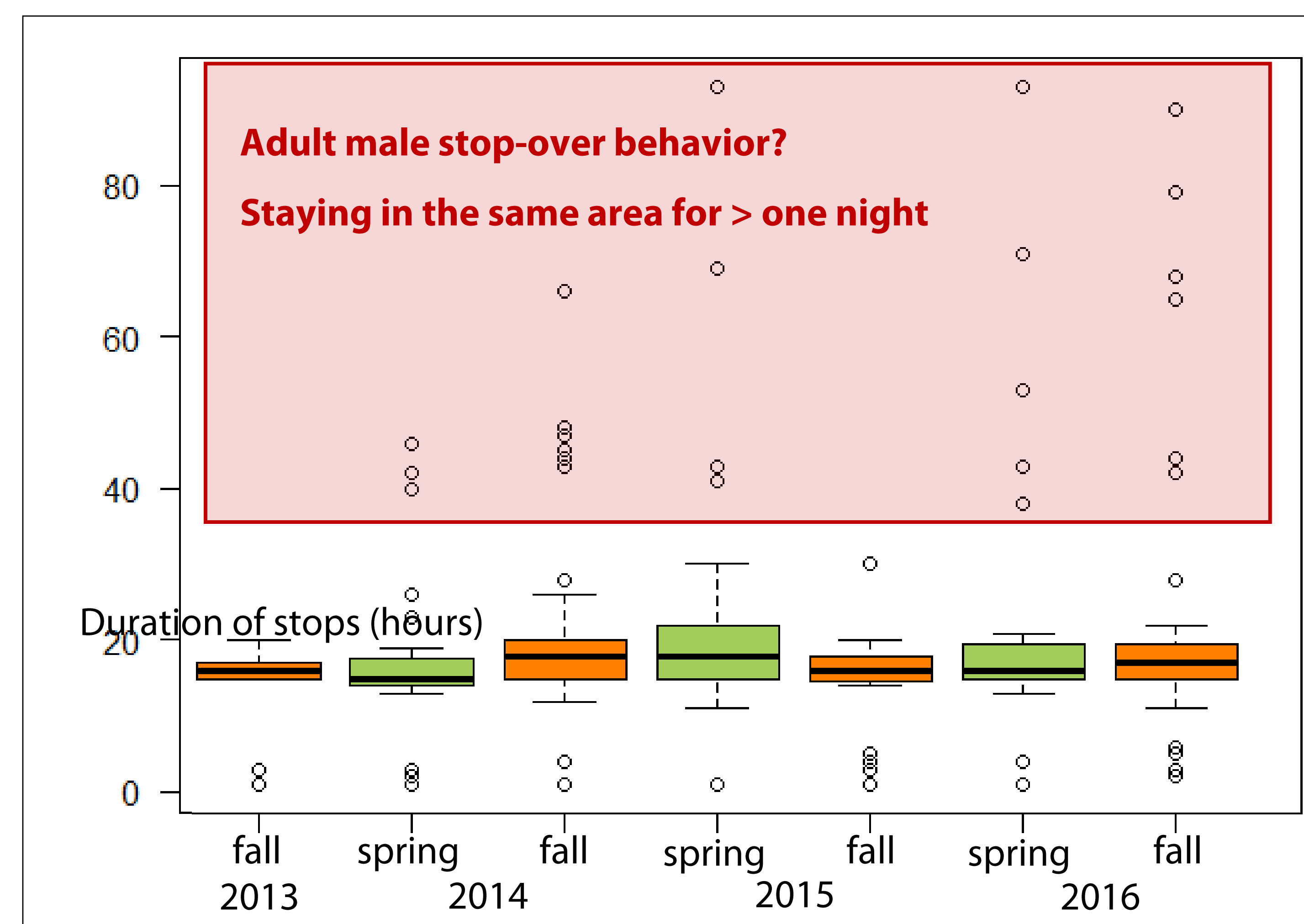
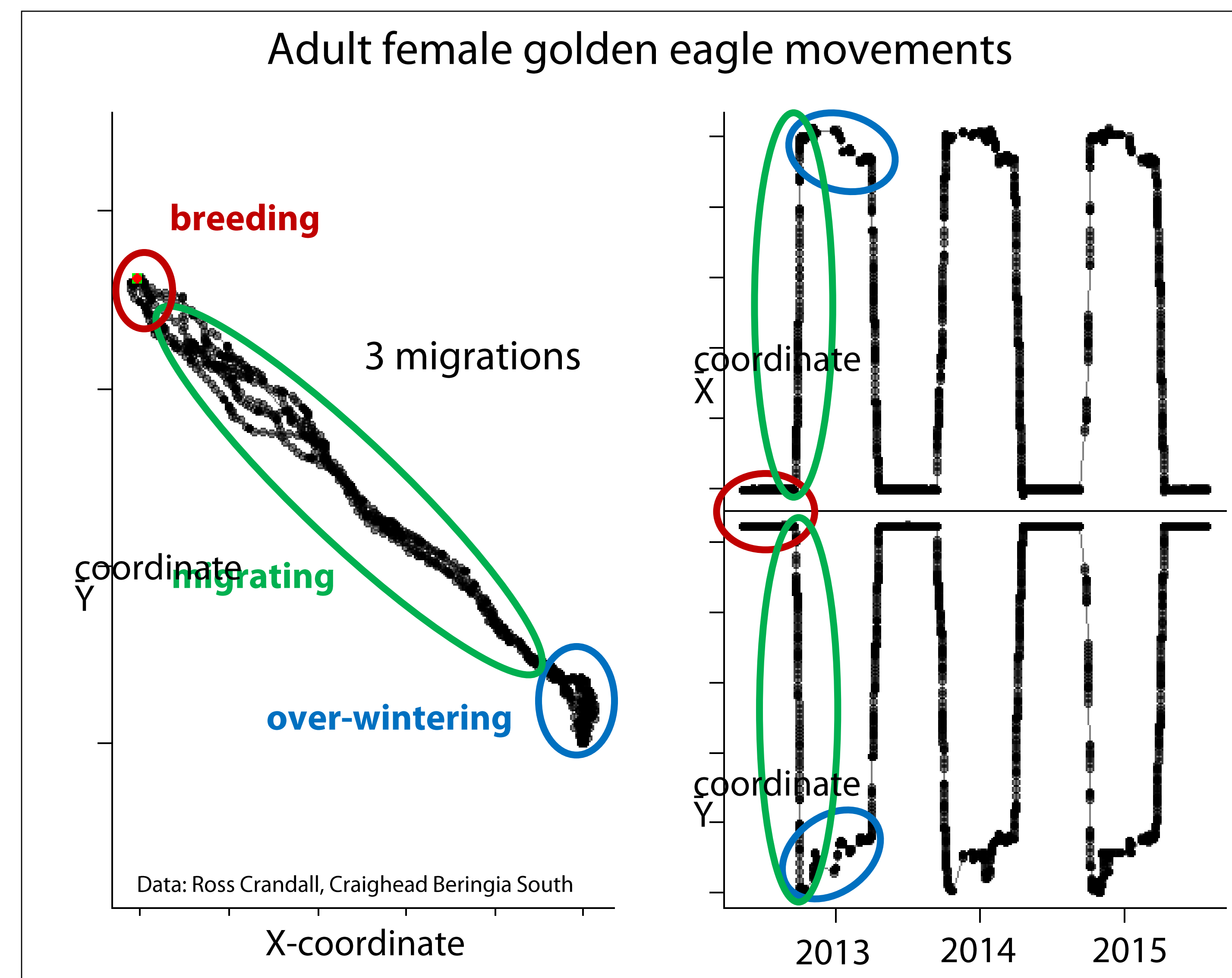
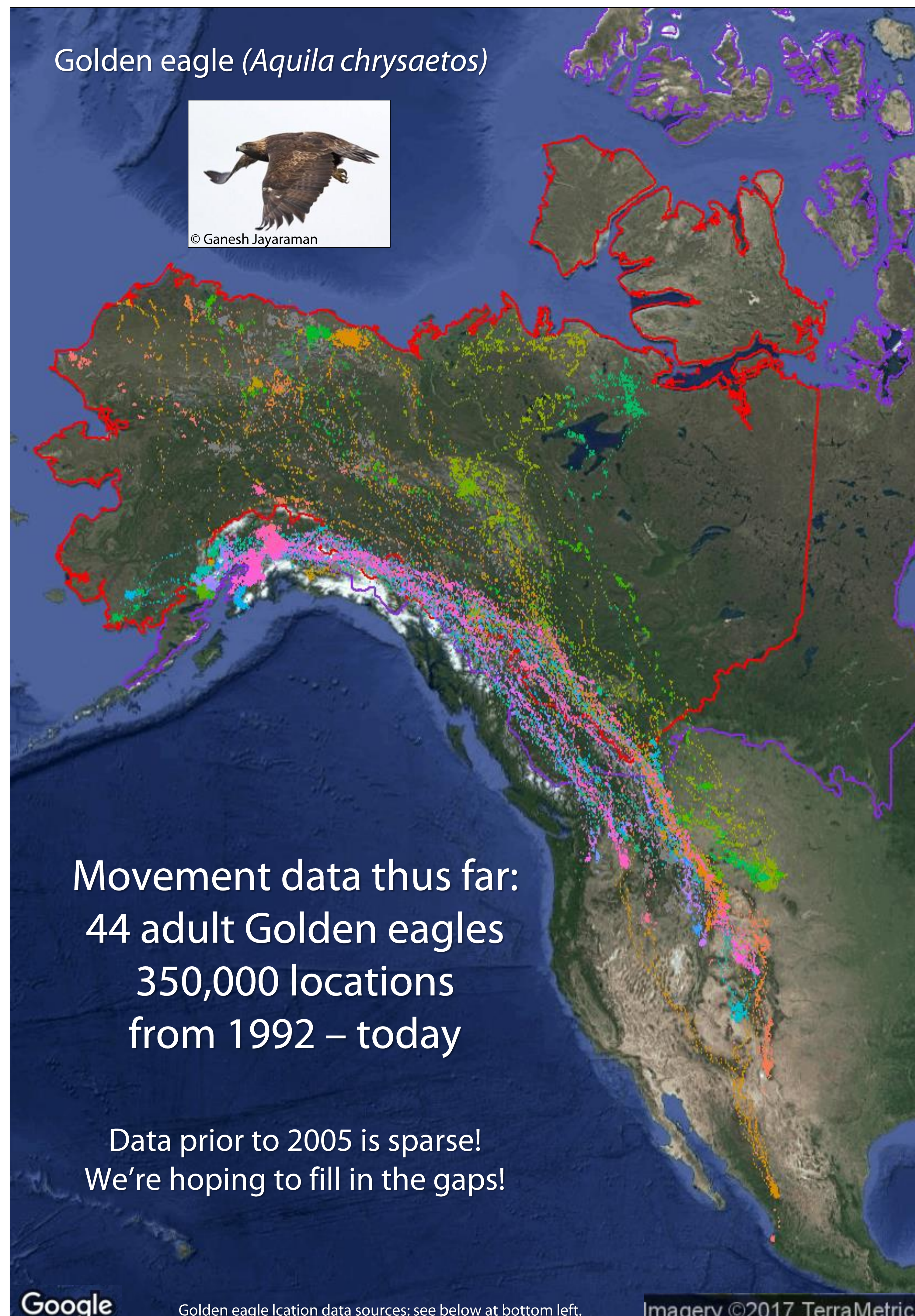
- These limitations hinder broader species-level conclusions and produce underwhelming evidence for a decadal-long phenomenon: climate change.

## Aims:

- To quantify golden eagle migratory behavioral responses over the previous two decades, identify relationships between these behaviors and environmental covariates, and determine whether golden eagles are responding to environmental changes.

## Our approach:

- Build and manage a **golden eagle movement database** from existing data via movebank.org.
- Clean data (i.e., identify spatial outliers, deployment start/stops, duplicate timestamps, assess spatial location error, etc.).
- Exploratory data summaries.
- **Identify behaviors** from movement data.
- Identify relationships between behaviors and the environment and determine whether these relationships are plastic or static over time.



## Current state:

- Data collection, cleaning, exploring, and summarizing.
- Exploring and refining analytical approach, for both:
  1. Track behavioral segmentation, and
  2. Annotating location data with environmental covariates, e.g., here: →

## Moving forward:

- Finalize data collection cut-off and database,
- Identify "best" available covariates, including snow, weather, and land cover, and
- Finalize and execute behavior-environment relationship model.

