

Golden eagle migratory behavior and arctic warming

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The challenge:

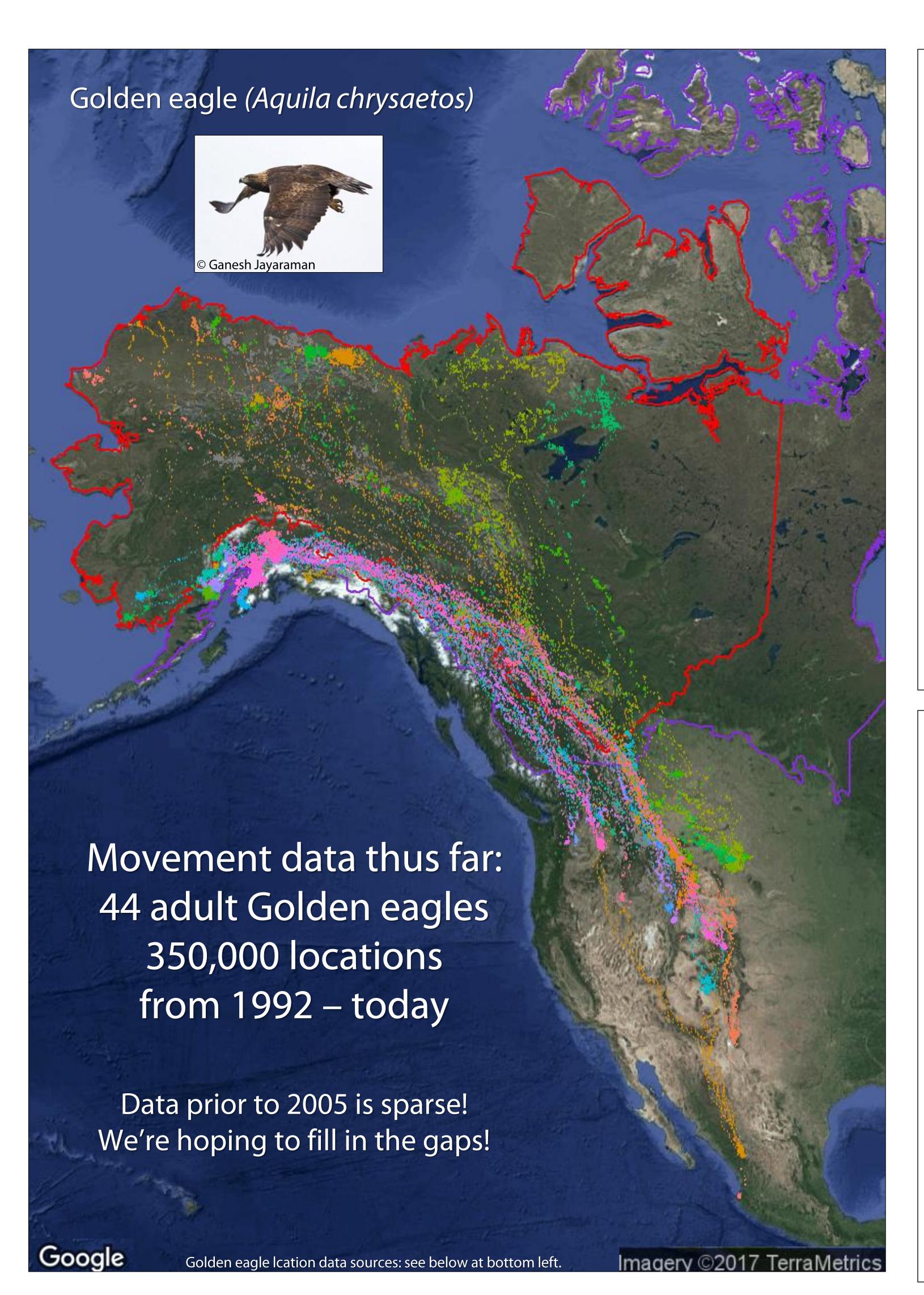
- Understanding how animals adapt to climate change is a conservation priority, but challenging, at least because:
- the necessary long-term animal behavior data sets are rare and complex when available, and
- 2. studies are conducted at site- and population-specific levels, often at short temporal scales (i.e., 2-3 years).
- These limitations hinder broader species-level conclusions and produce underwhelming evidence for a decadal-long phenomenon: climate change.

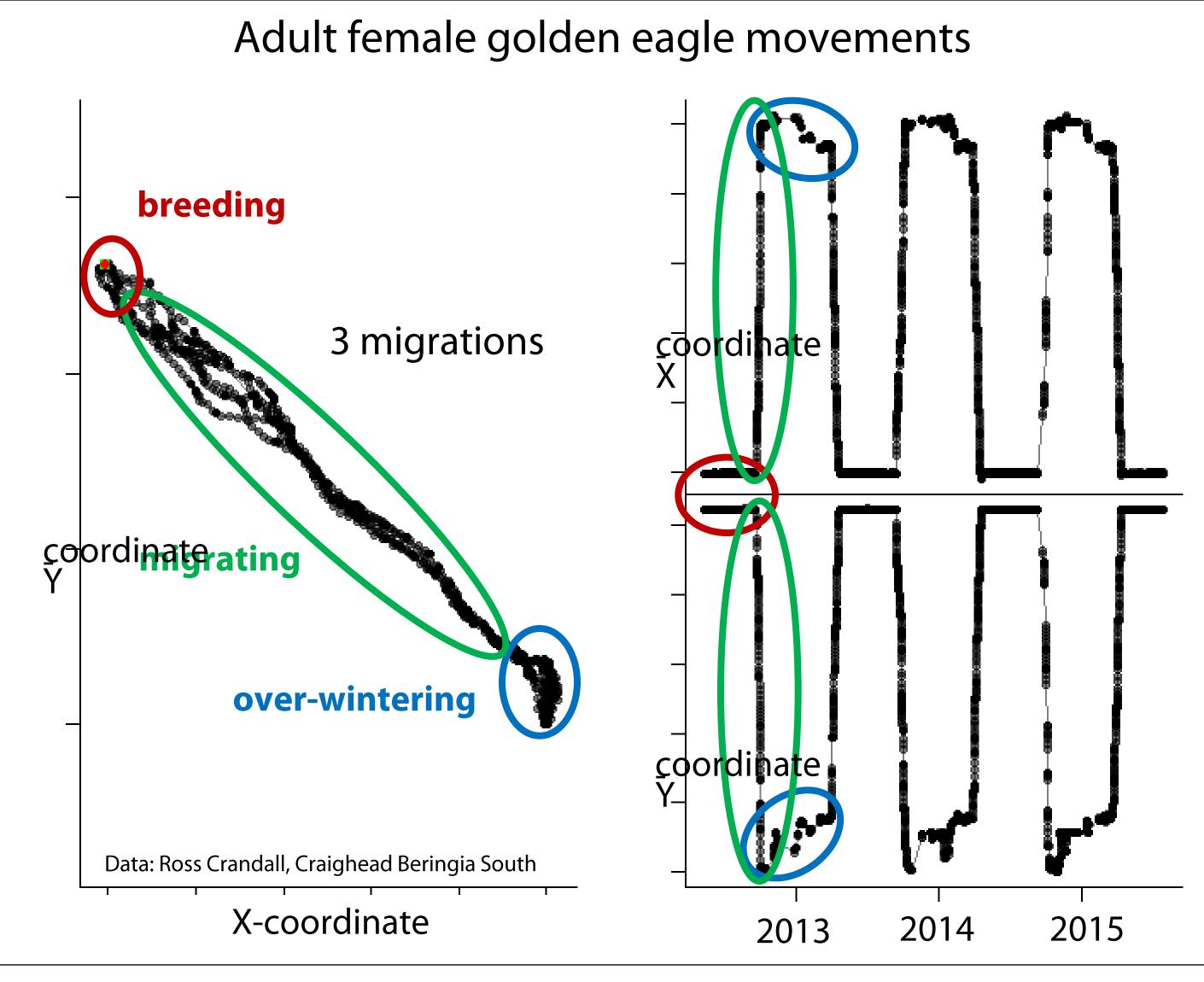
Aims:

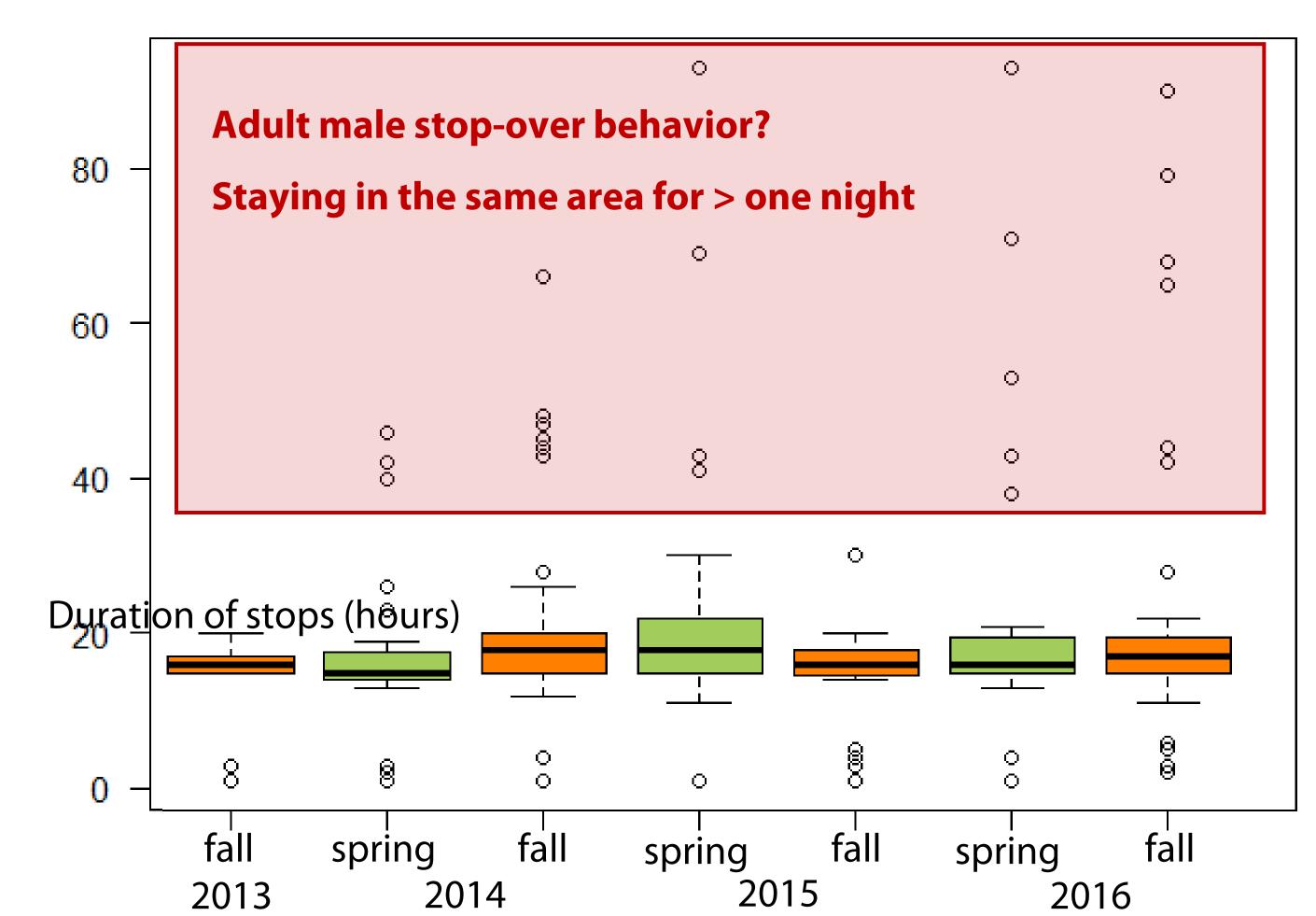
- To quantify golden eagle migratory behavioral responses over the previous two decades, identify relationships between these behaviors and environmental covariates, and determine whether golden eagles are responding to environmental changes.

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.

% Snow Cover
100%
50%
Eagle: Ross Crandall, Craighead Beringia South
Snow: MODIS Snow Terra 500m, Dally, NDSI
Magery © 2017 Terra Met

Tracking locations of an adult female

Transparent points: snow data is NA

and the % snow cover at each location.

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