

Habitat use of Black-tailed Godwits in the Senegal River Delta

BACKGROUND

Addressing a significant knowledge gap in the annual cycle of continental Black-tailed Godwits (*Limosa limosa limosa*), this study describes the space-use patterns of wintering godwits in relation to natural/semi-natural wetlands, rice-production, and protected areas in a key non-breeding site, the Senegal River Delta.



KEY TAKEAWAYS

- The godwits analyzed in this study primarily used natural wetlands located within protected areas during pre-migration fuelling instead of rice fields, counter to prevailing knowledge.
- A prolonged *typha* infestation significantly reduces the area of suitable habitat within and outside of protected areas.
- Rice fields are important alternative habitats during both the growth stage and post-harvest, and should be included under future conservation schemes as buffer zones for protected areas.

RESULTS

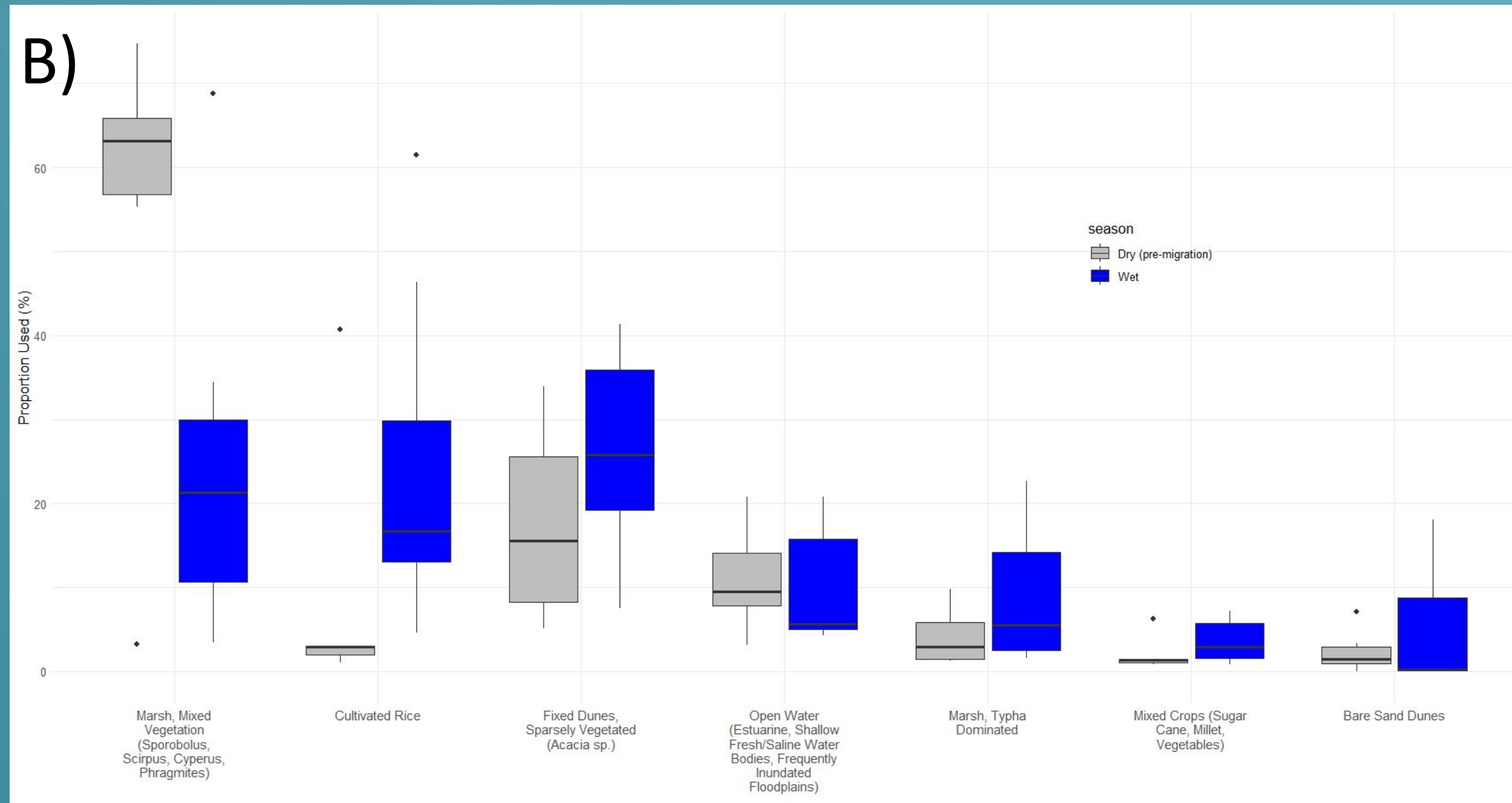
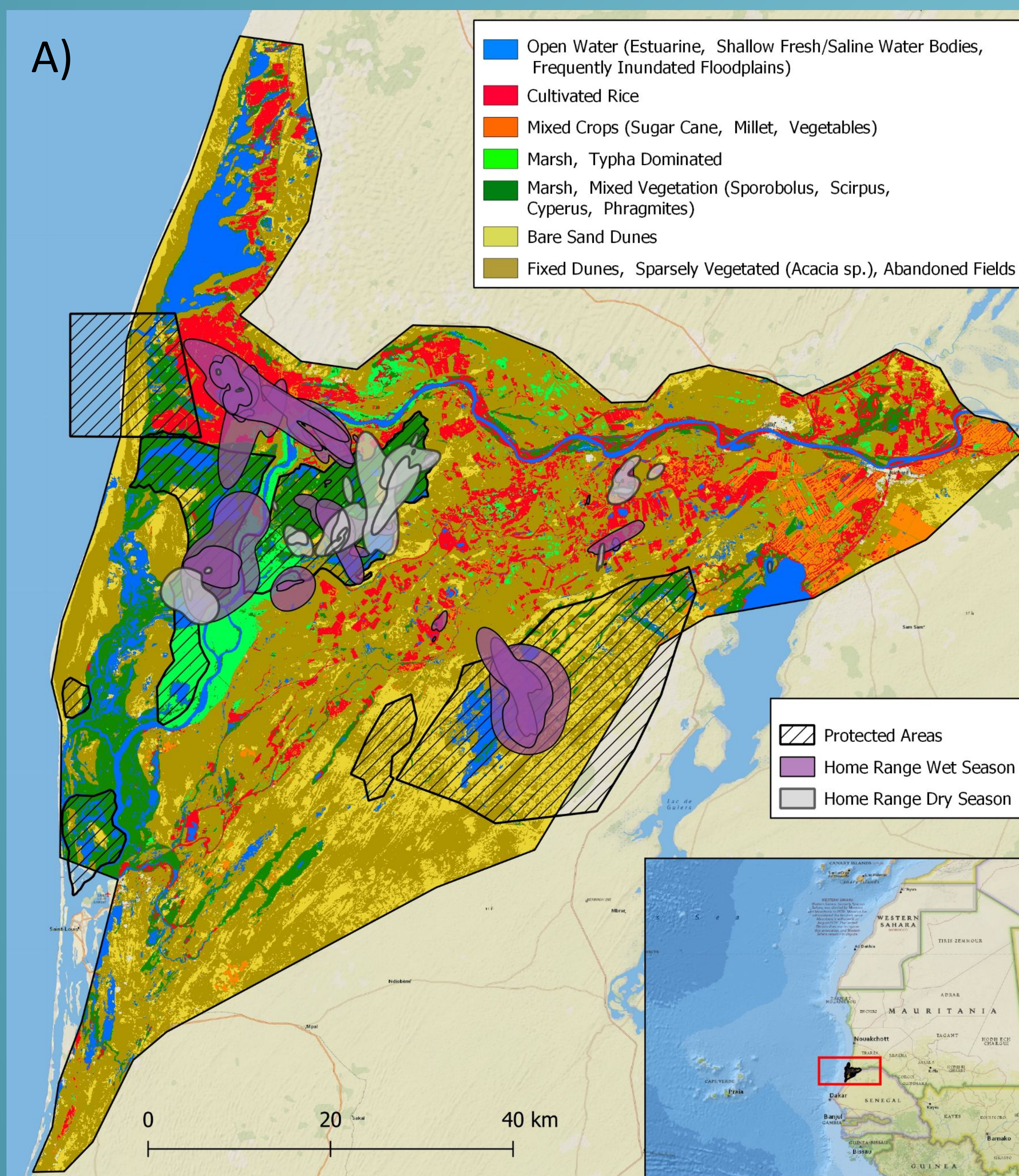
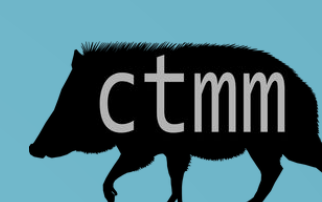


Figure A: Land cover map of the Senegal River Delta, overlaid with home range areas of wintering godwits.
 Figure B: Godwit habitat-use comparison between the wet and dry season in the Senegal River Delta.

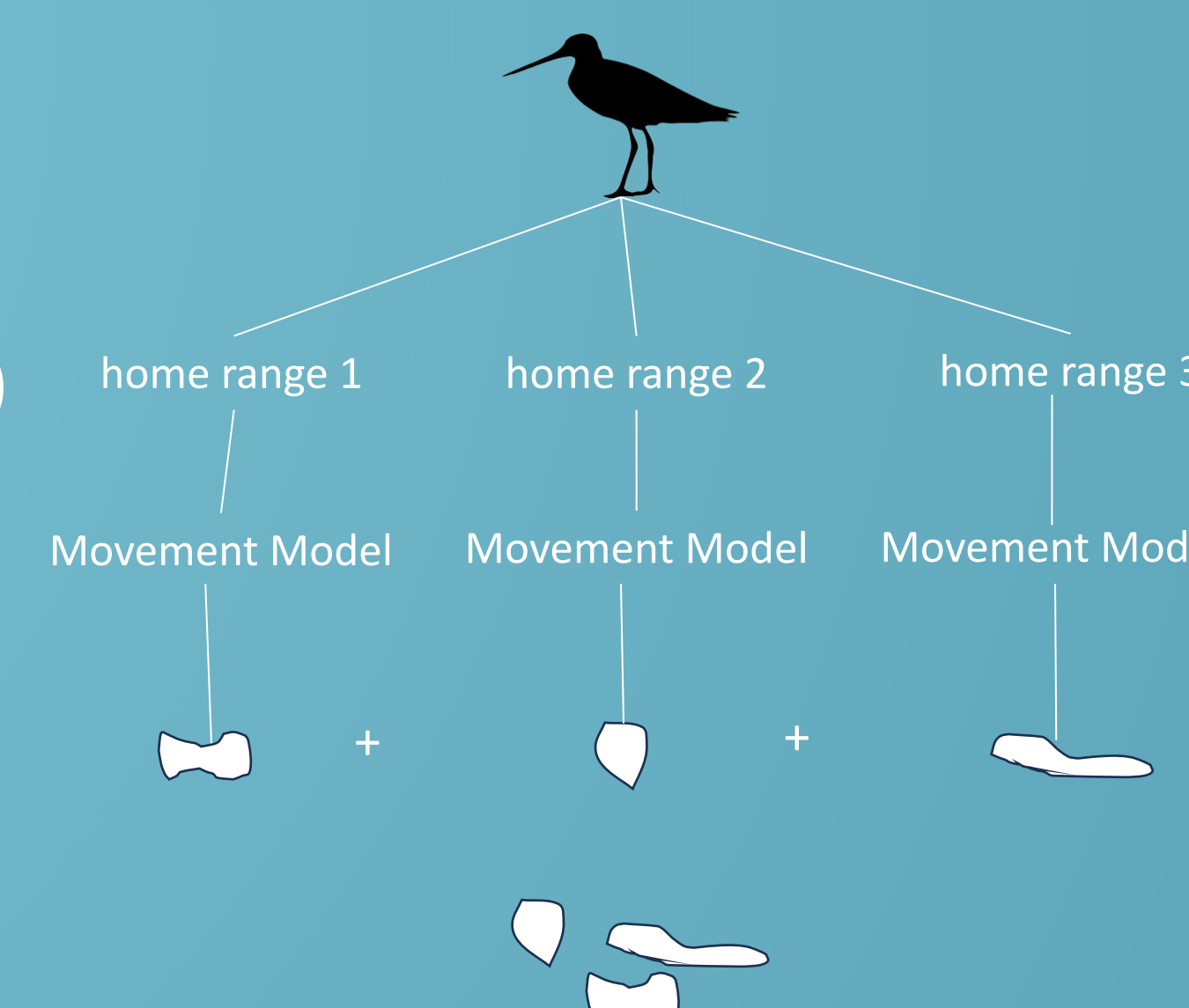
METHODS

Home Range Estimation



We fit continuous-time stochastic-process movement models with GPS location data from godwits tagged between 2021-2022 in the Netherlands and Germany. Using the continuous-time movement modelling (ctmm) framework, we created autocorrelated kernel density estimates (AKDE) for each tagged godwit with wintering range residency in the Senegal River Delta.

1. Segment tracks to home range(s)
2. Fit movement model
3. Autocorrelated Kernel Density Home-Range (AKDE)
4. Combine individual AKDEs



Land Cover Classification



A land cover map of the Senegal River Delta was created in Google Earth Engine using a supervised random forest classifier on Landsat 8 imagery. Ground-truthing points were acquired from field surveys, Google Earth imagery, and existing land cover maps.

Habitat Use

We assessed the overlap between individual wintering home range areas using the Bhattacharyya coefficient and compared the use of rice fields and natural/semi-natural wetlands by separating home ranges into two distinct periods:

- 1) the wet season/rice cultivation period between July and November
- 2) the dry season/post-harvest period between November and March

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