Provenance and tortoise settling and survival rates on the BCCE

Clark County Desert Conservation Program
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Introduction

- Translocations are common with Mojave desert tortoises
- Provenance of tortoises is variable
  - Wild
  - Headstarted
  - Waif

Waif tortoises : 153,783 (SD 44,755)
pet tortoises in the Las Vegas area

*UNLV Center for Business and Economic Research, 2018

Introduction

- Does provenance matter in translocation?
  - When are translocatees ‘settled’?
  - Do translocatees survive equivalent to resident tortoises?
  - What does this mean for Mojave desert tortoise conservation?

Methods

Provenances

- Wild: 9 [6 F, 3 M, (1 Juv)]
- Headstarted: 8 Juv
- Waif: 51 [26 F, 25 M]
- Resident: 37 [12 F, 25 M]

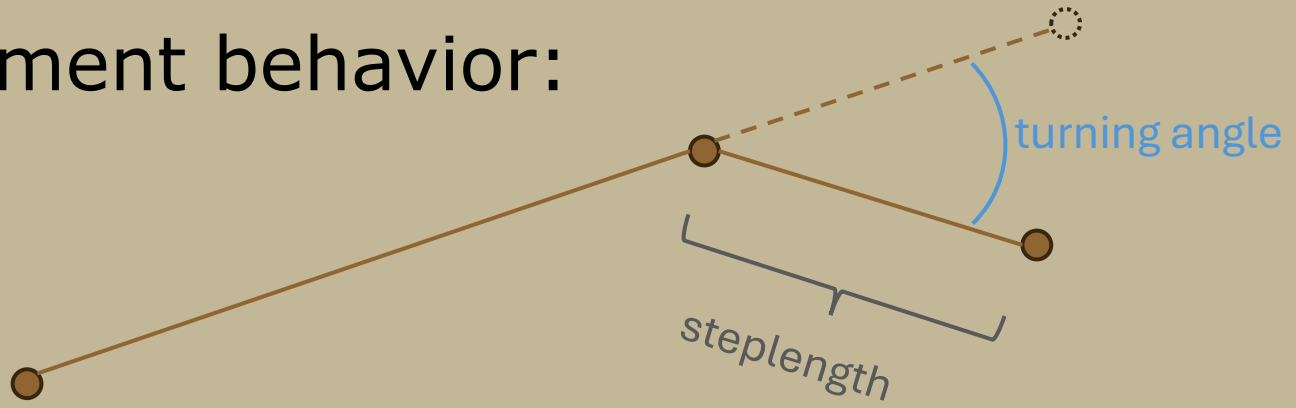
Field relocation Weekly (March – October)
Monthly (November – February)

Methods

Two measures of movement behavior:

- Persistence velocity

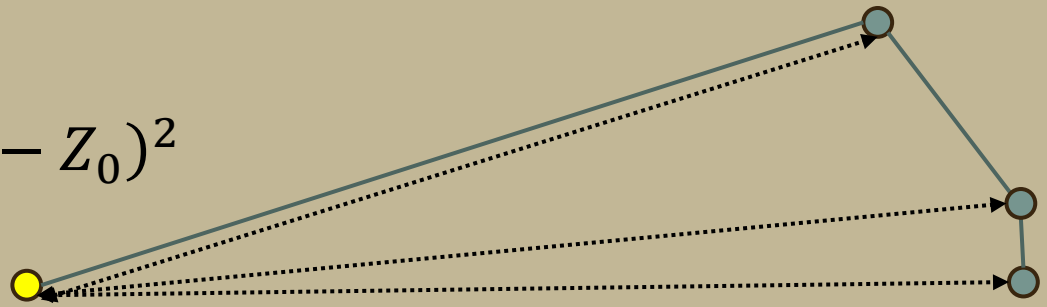
$$PV_t = \Gamma_t * \cos(\Psi_t)$$



- Net Squared Displacement

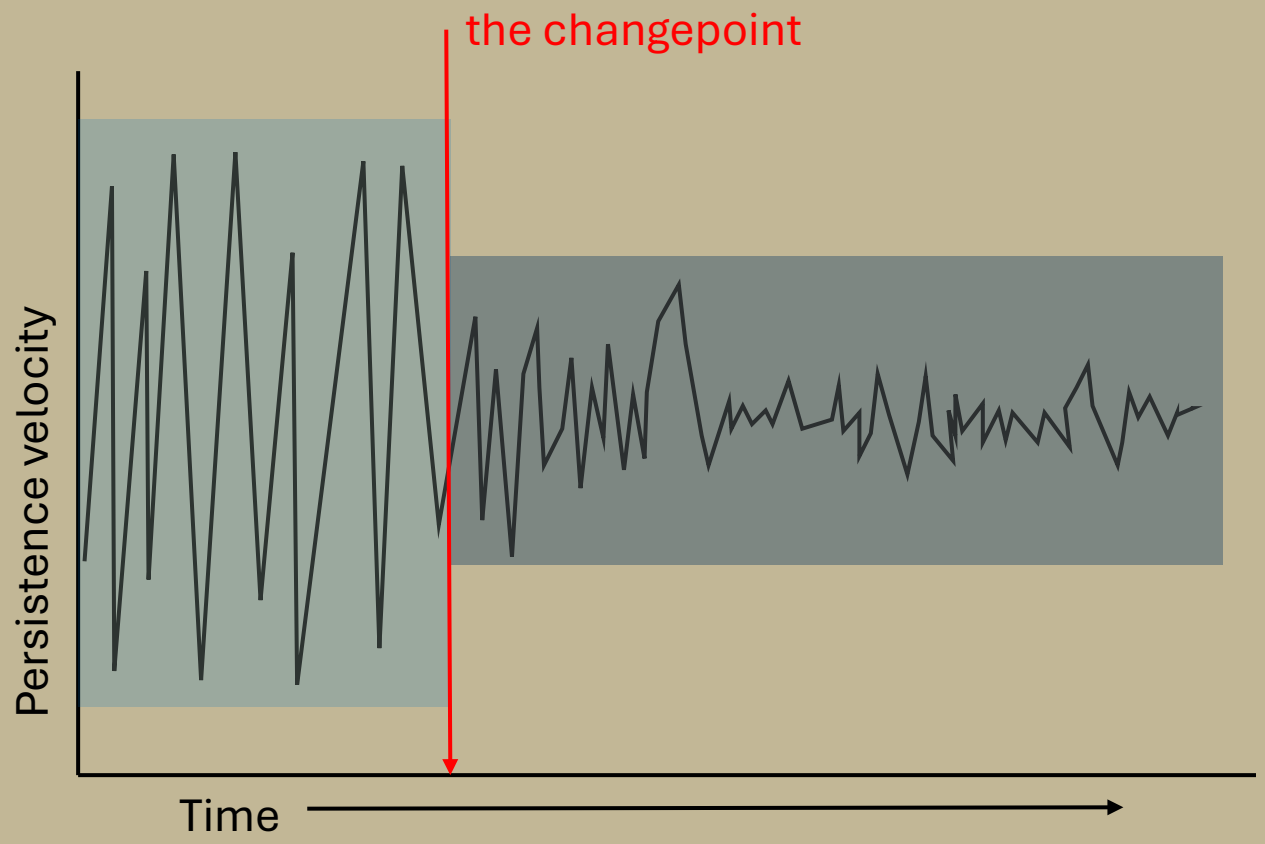
$$Z_t = \{X_t, Y_t\}$$

$$NSD_t = (Z_t - Z_0)^2$$



Methods

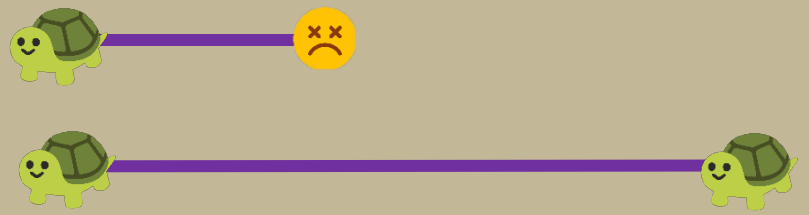
Bayesian changepoint models



Methods

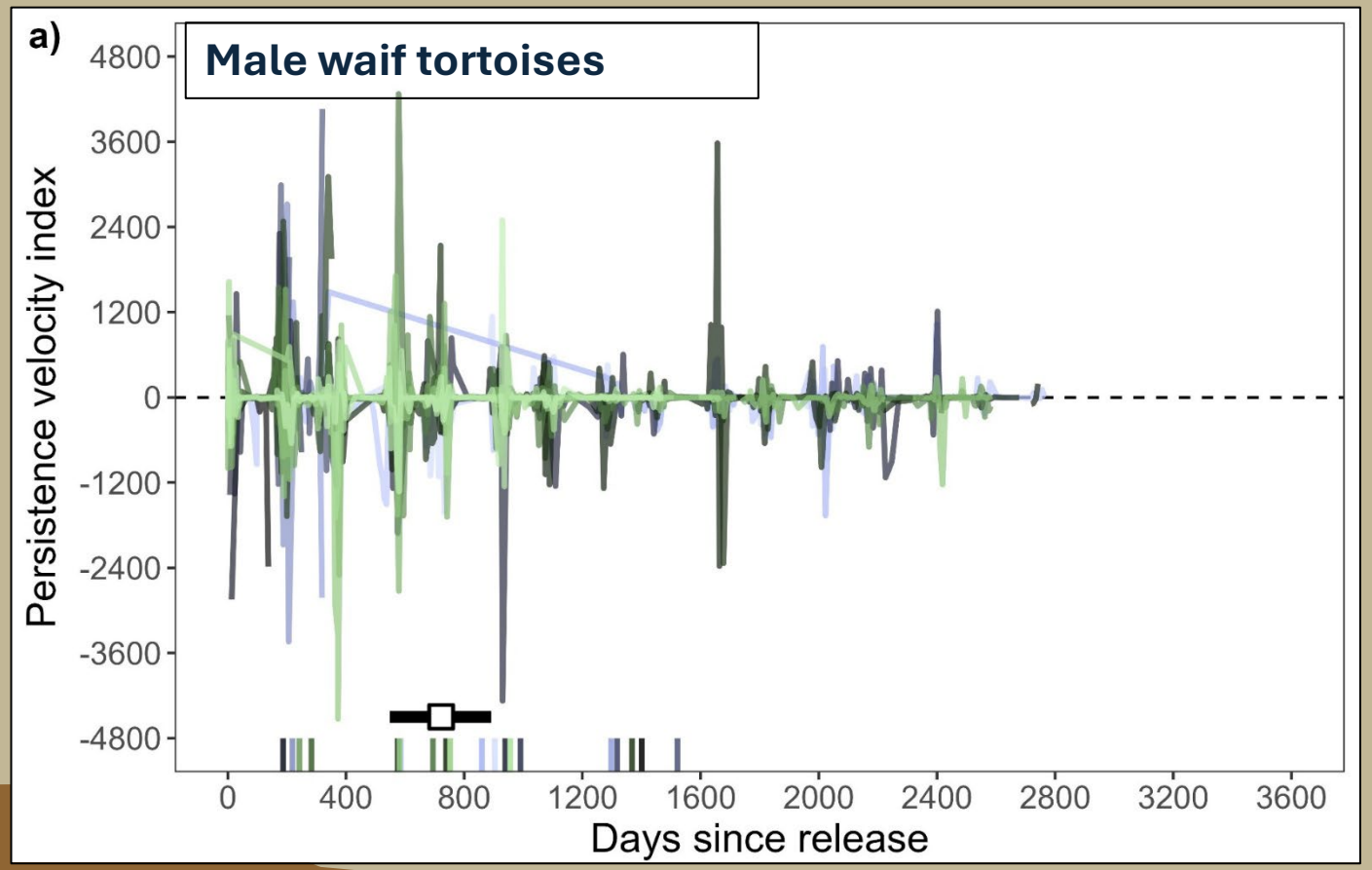
Home range size – 95% Kernel density

Survival - Cox proportional hazards model



Results

Time to ‘settling’



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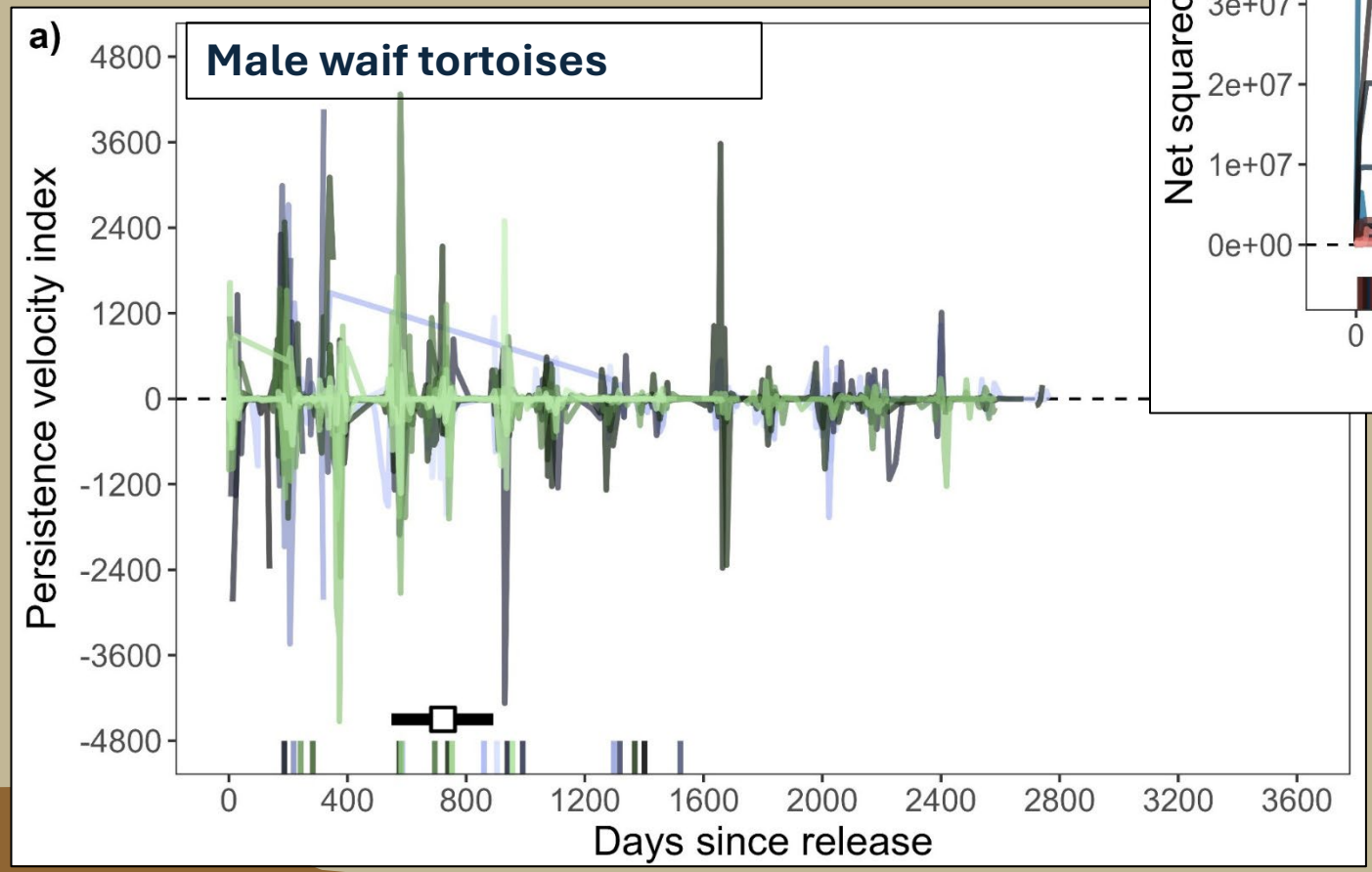

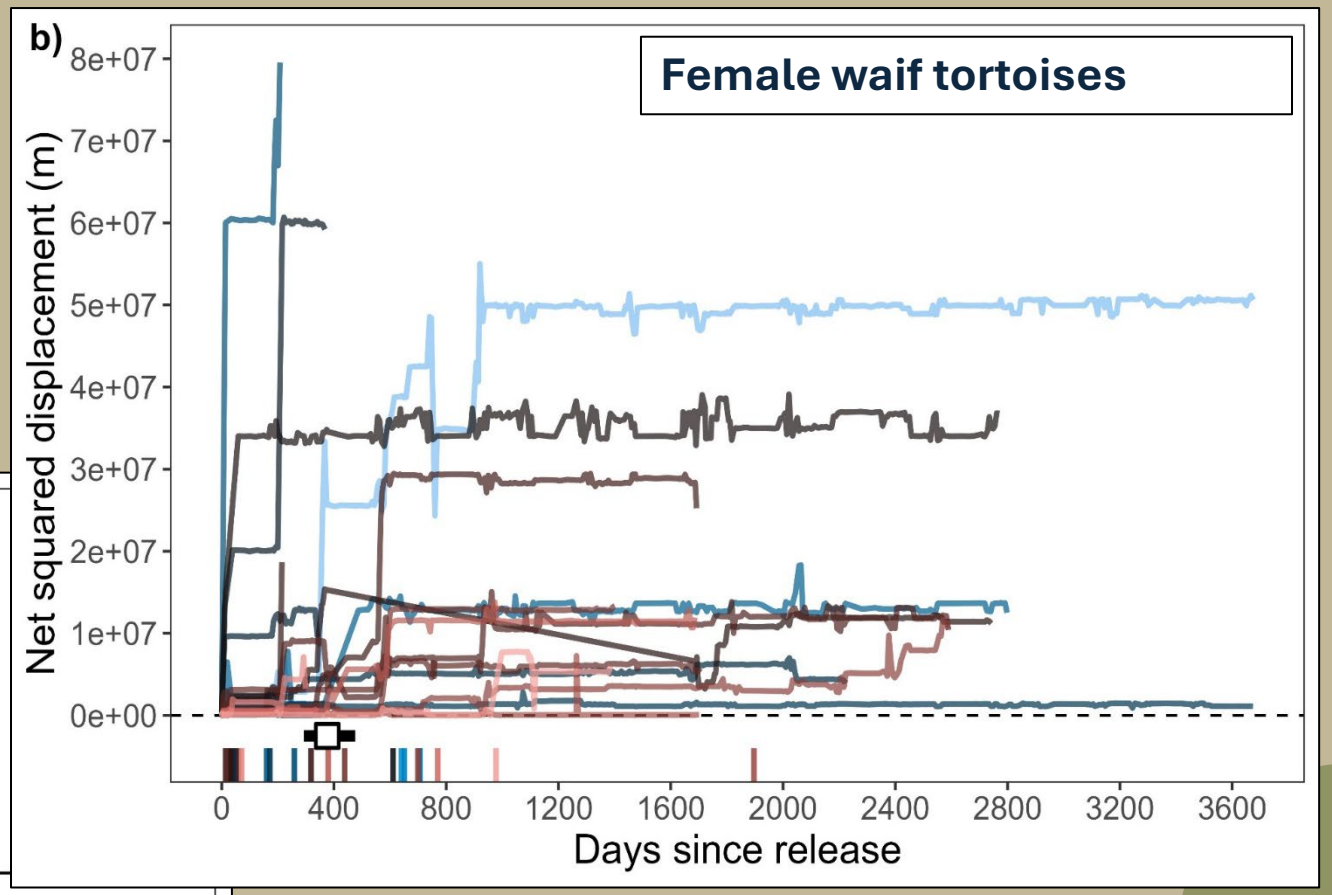

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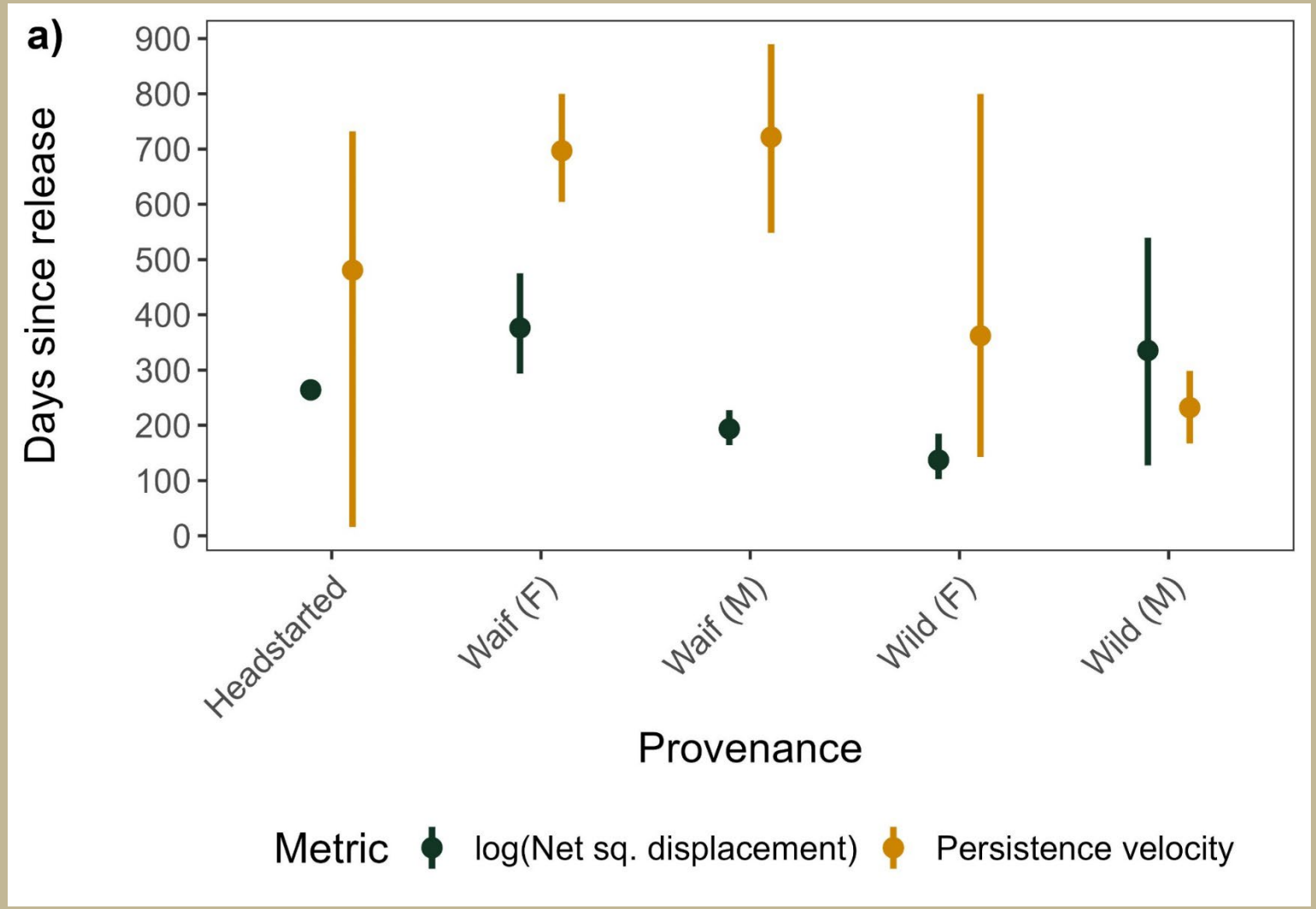
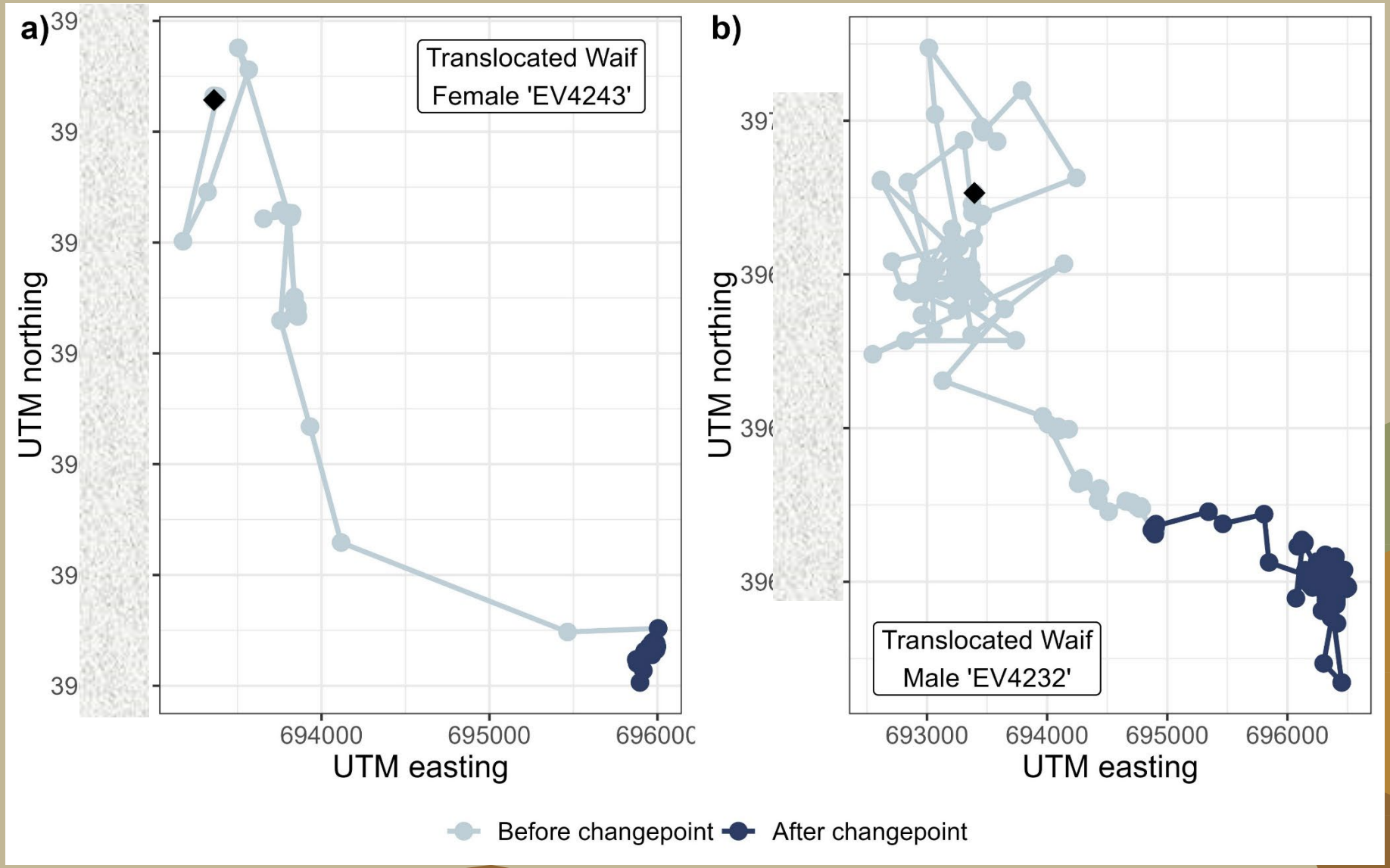


Results

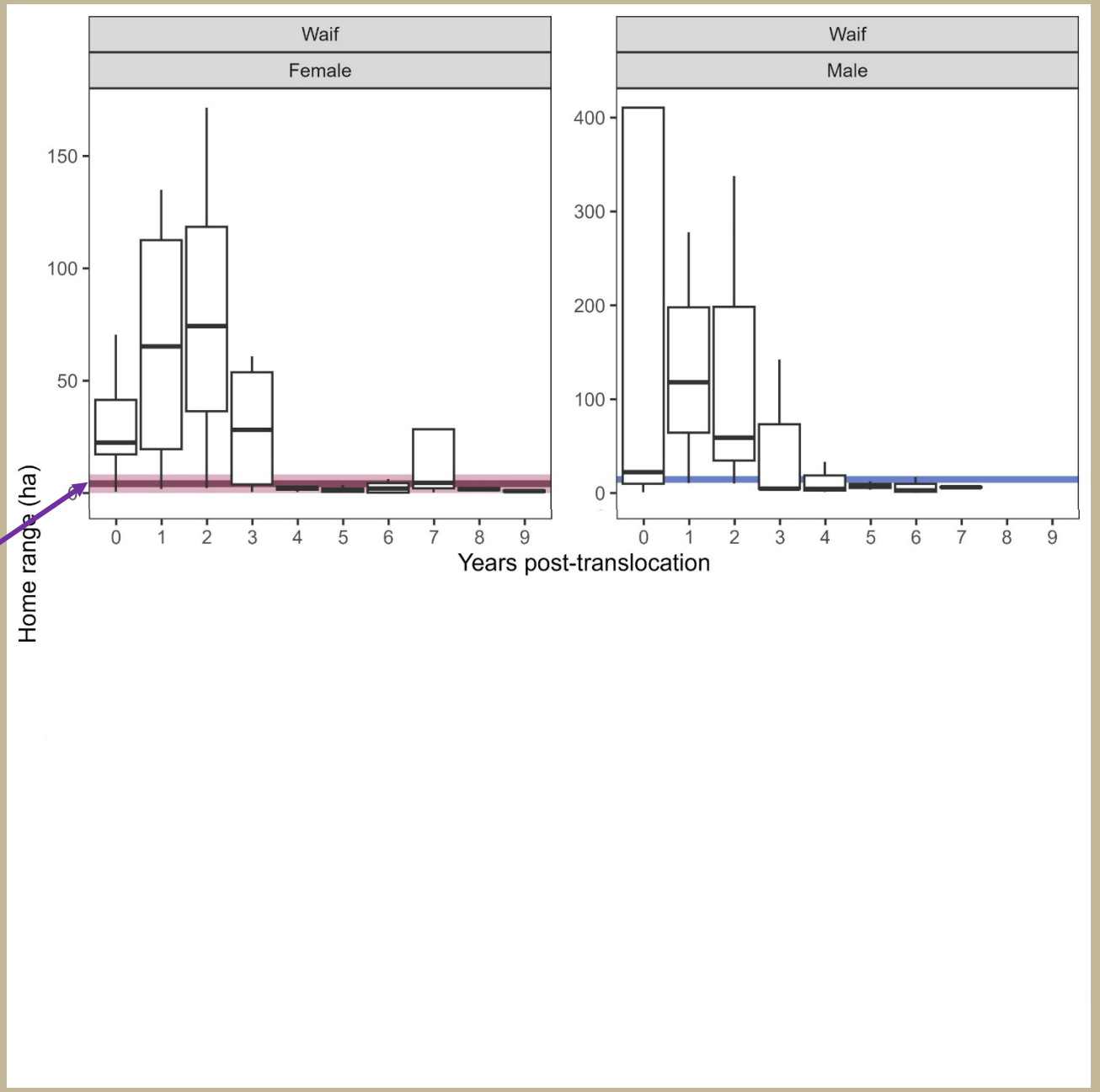
Before and after individual settling point



Results

Home range size

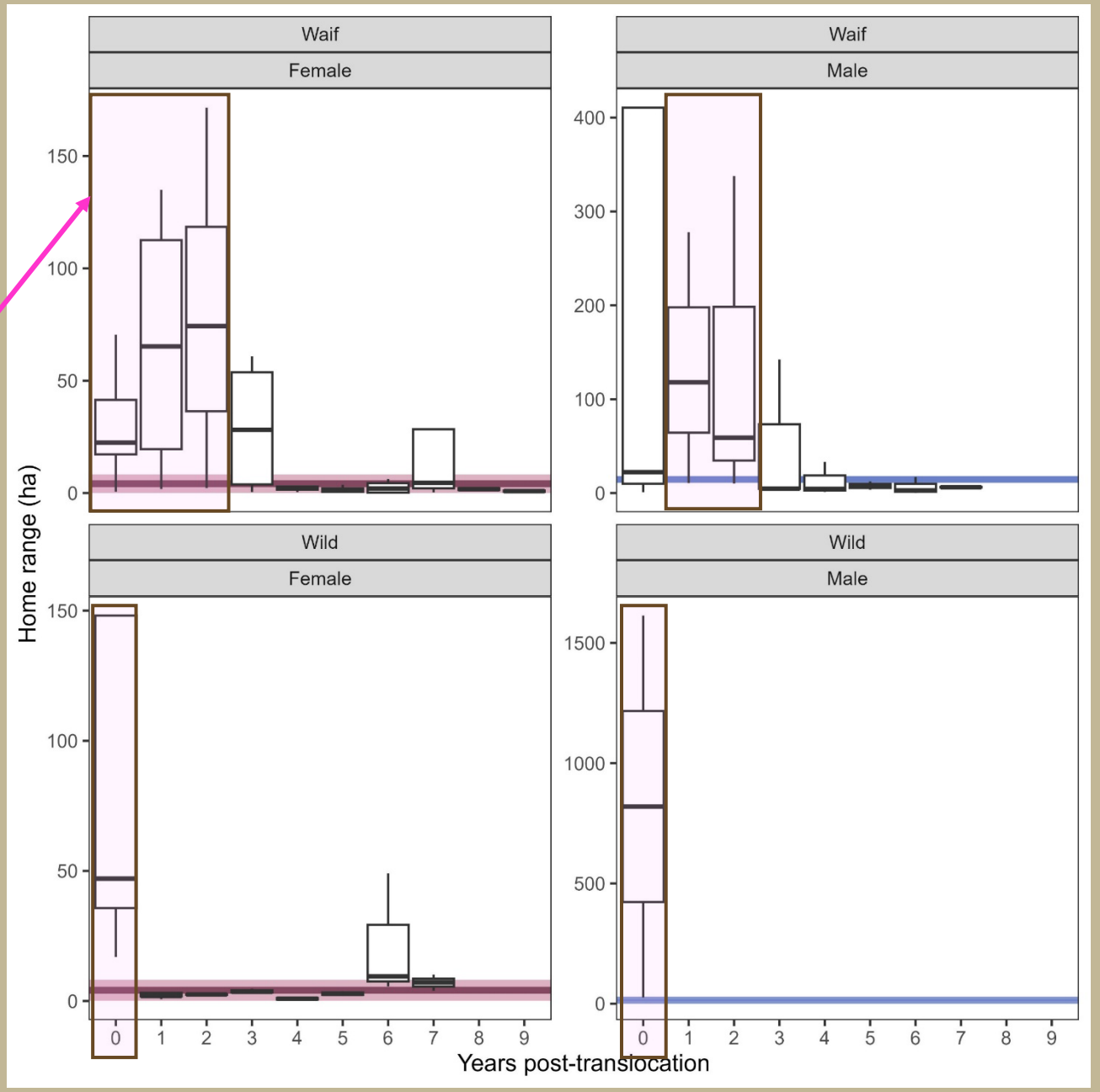
Resident home range size



Results

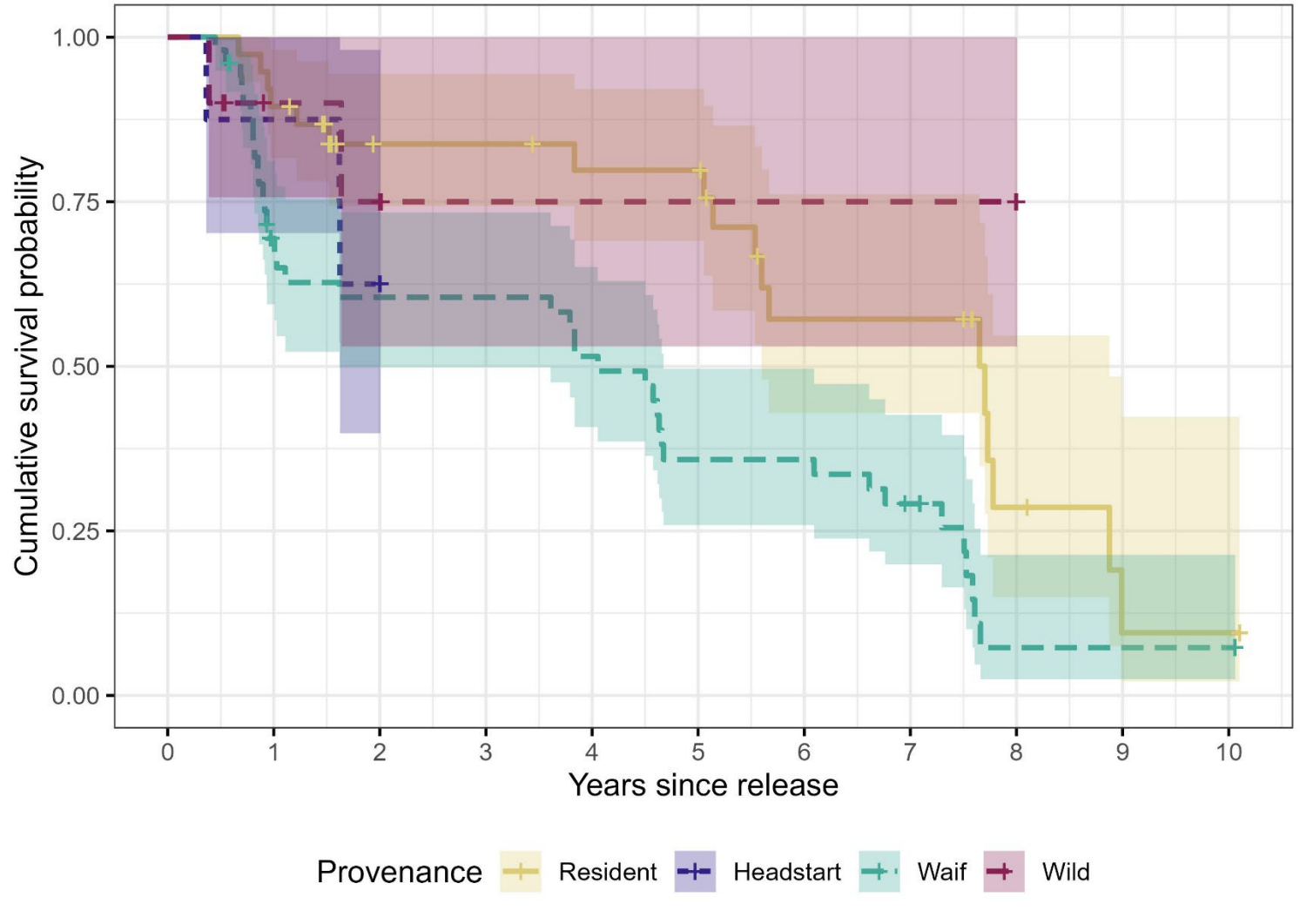
Home range size

Significantly larger home range



Results

Survival



Likelihood of dying
compared to residents

Waif – 2.3x [1.3 – 4.1x]

Headstarted – 2.0x [0.6 – 7.0x]

Wild – 0.5x [0.1 – 2.1x]

Discussion

- All provenances settled into a ‘home range’ within 0.5 - 1.0 yrs
- Persistence velocity indicated frantic movement until 1-2 yrs
- Waif tortoises took longest to settle, ~2.0 years
- High inter-individual variability in settling times

Discussion

- Home range size corroborated 2-3 yr settling time, and agreed with previous work that used the same calculation (Field et al. 2007, Nussear et al. 2012)

Waif tortoises took longest time to settle

Discussion

- Same as previous work, translocated wild and headstarted tortoise survival did not differ from residents
- Downside to translocating waifs: lower survival
- Likely due to lack of experience

Discussion

Implications for conservation:

- Waif tortoises are a promising source for translocations
- Genetic concerns
- Disease concerns
- Species ID concerns

Acknowledgements

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Desert Conservation Program

Section 10 Funding

Thank you

Methods

Survival - Cox proportional hazards model