

Project 46 draft update: Using remote data collection techniques to estimate mule deer abundance in NW Nevada

Sean Sultaire, PhD, University of Montana

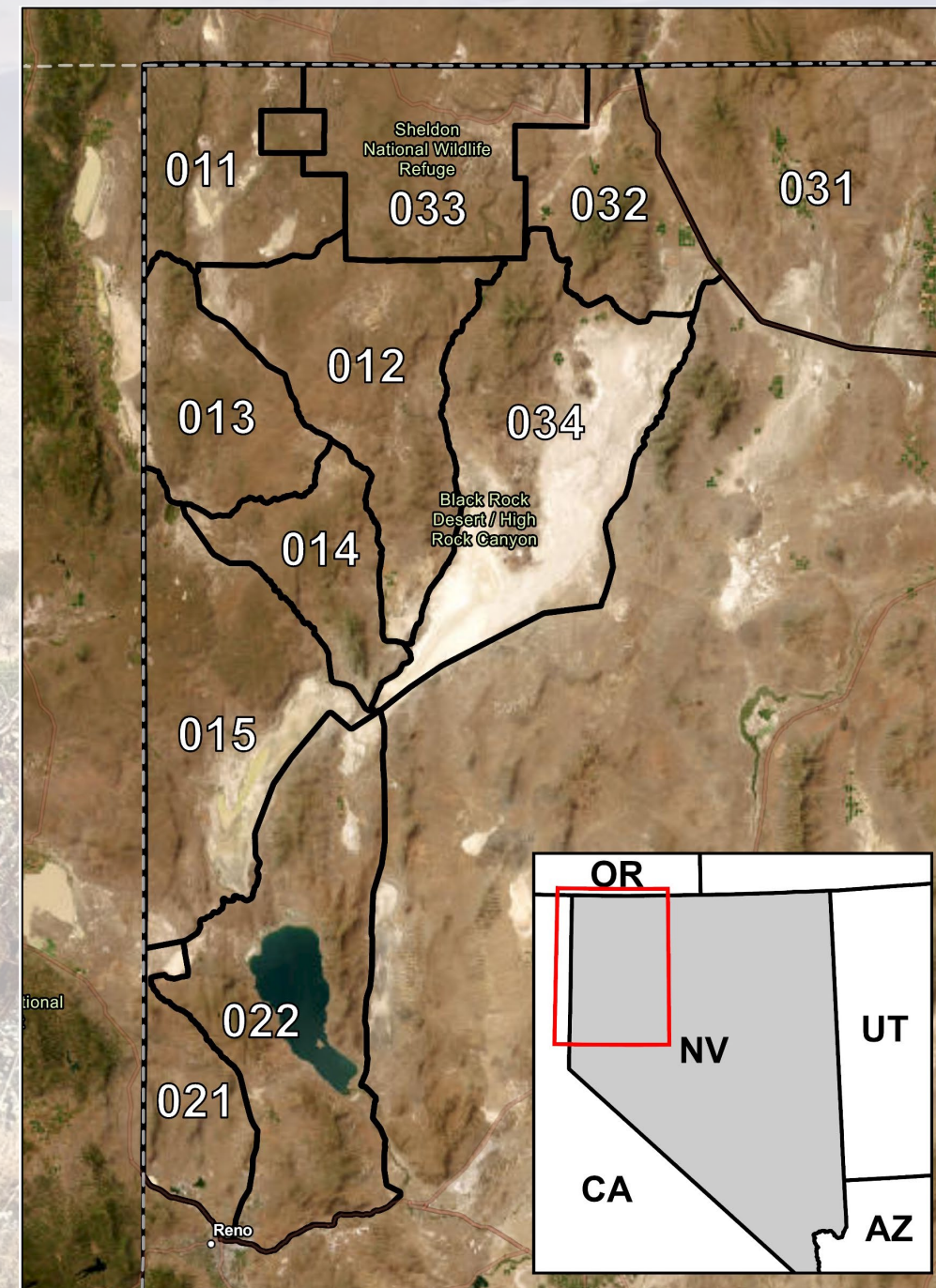
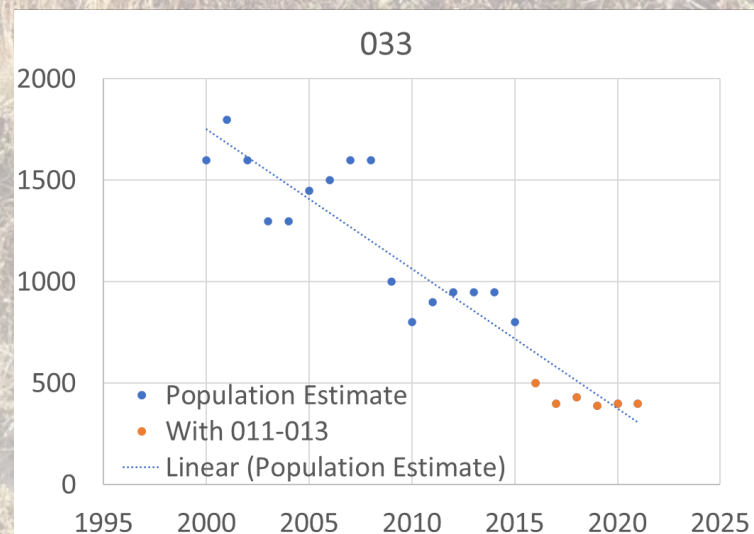
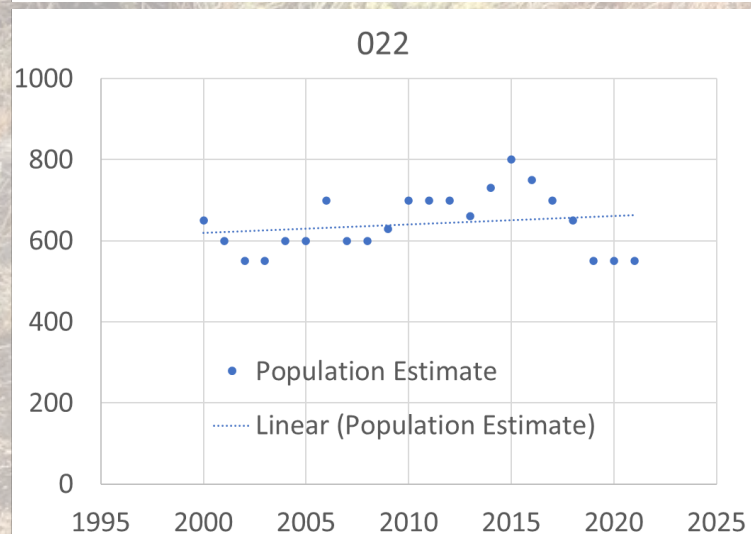
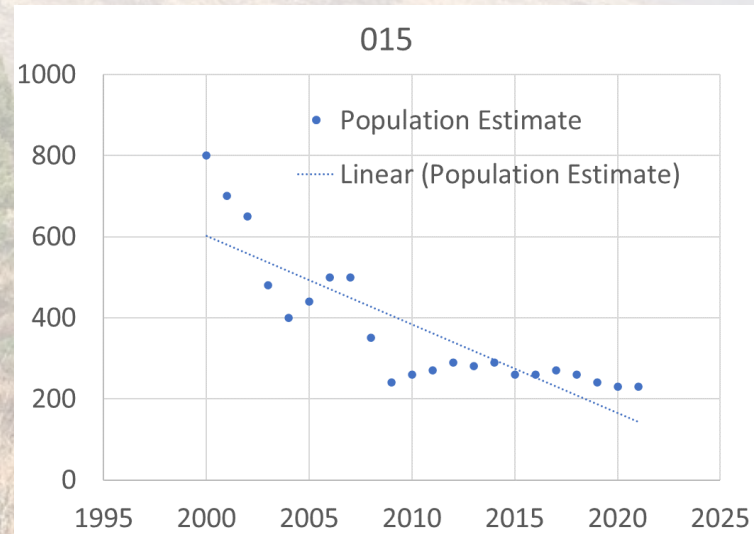
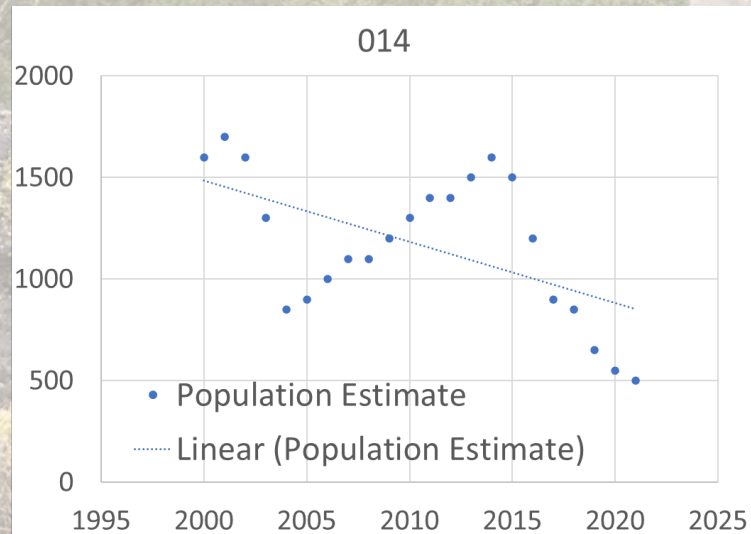
Robert Montgomery, PhD, University of Oxford

Joshua Millspaugh, PhD, University of Montana



Northwest Nevada mule deer

Estimated population trends (NDOW) for select hunt units



Project 46 objectives

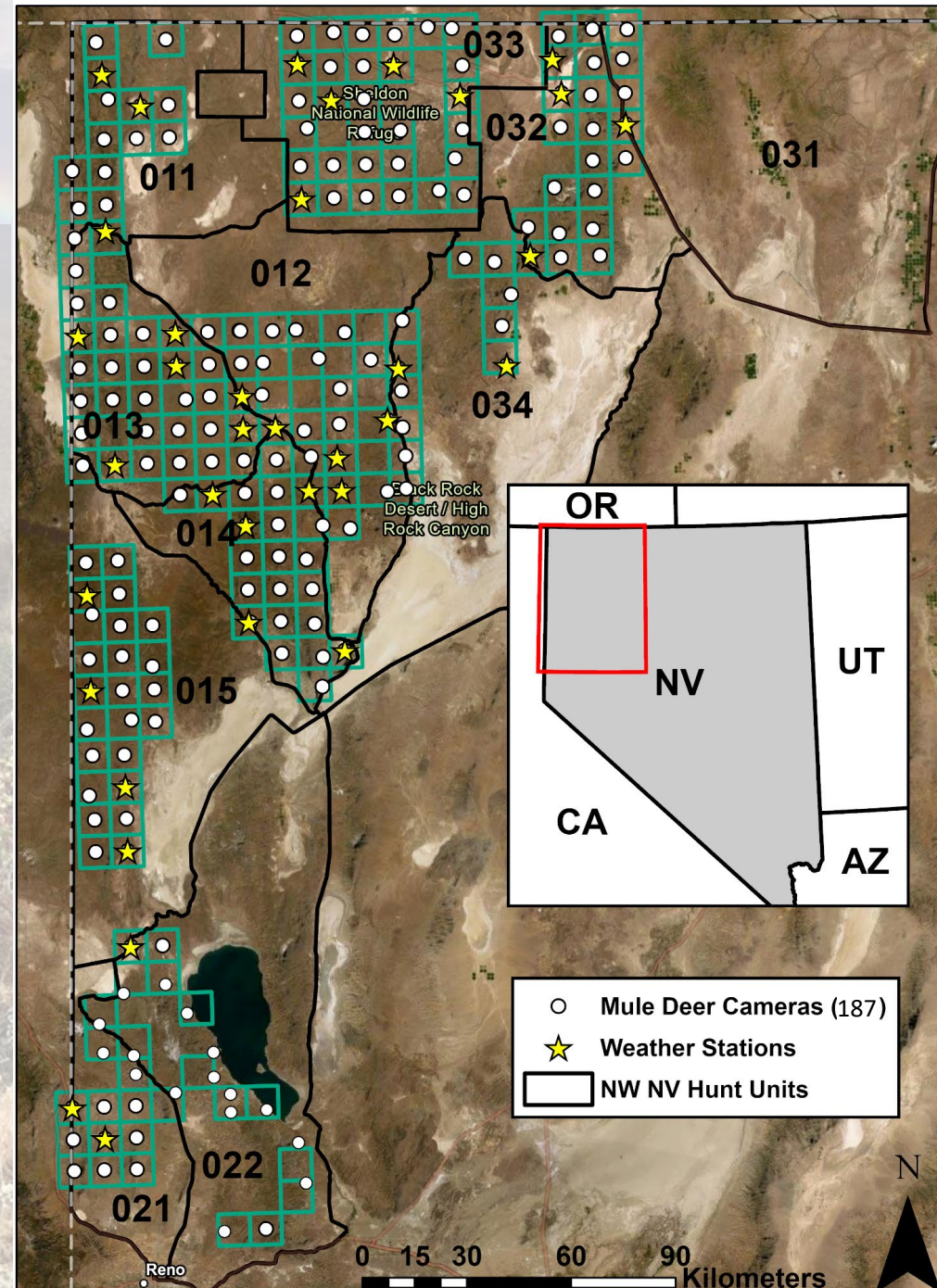
Use remote data collection methods to:

1) Estimate mule deer abundance in NW Nevada

2) Quantify environmental factors correlated with mule deer occurrence and abundance across the region



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Camera viewsheds

- Cameras sample a viewshed (blue area) when triggered
- Size of viewshed determined by:
 - length (radius) r
 - width determined by lens angle θ



Time-to-event (TTE) model

Cameras sample a viewshed (blue area) when triggered

Size of viewshed determined by:

- length (radius) r
- width determined by lens angle θ

Greater species abundance =
shorter time to detection (event)

Moeller et al. 2018 *Ecosphere*;
Moeller et al. 2022 *Rem. Sens. Ecol and Cons*



Moeller et al. 2022

Movement rate



GPS collar data

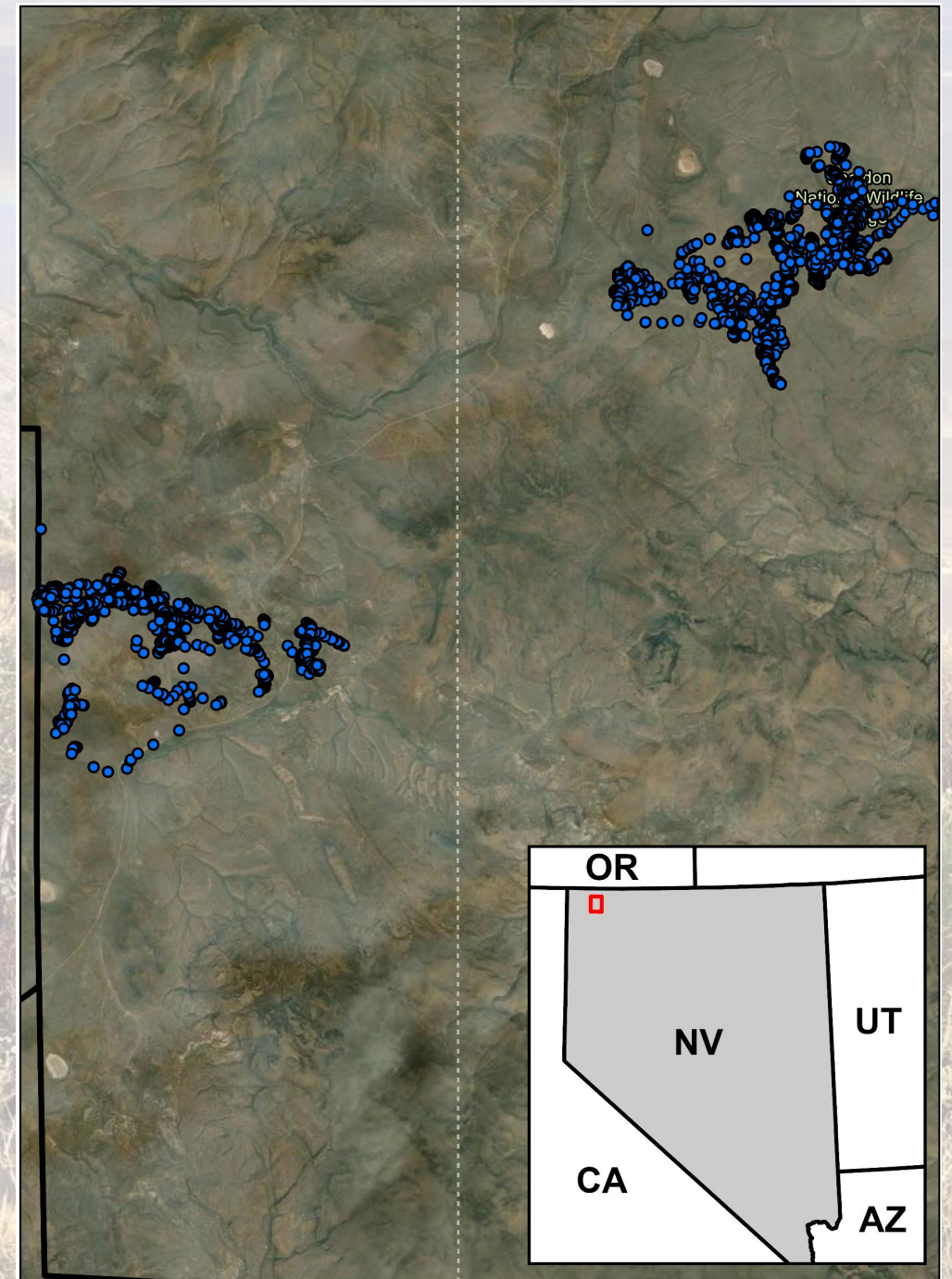
6 individuals (3 bucks, 3 does)
set to 15 min fix rate

15 min movement
rate = 0.052 m/s

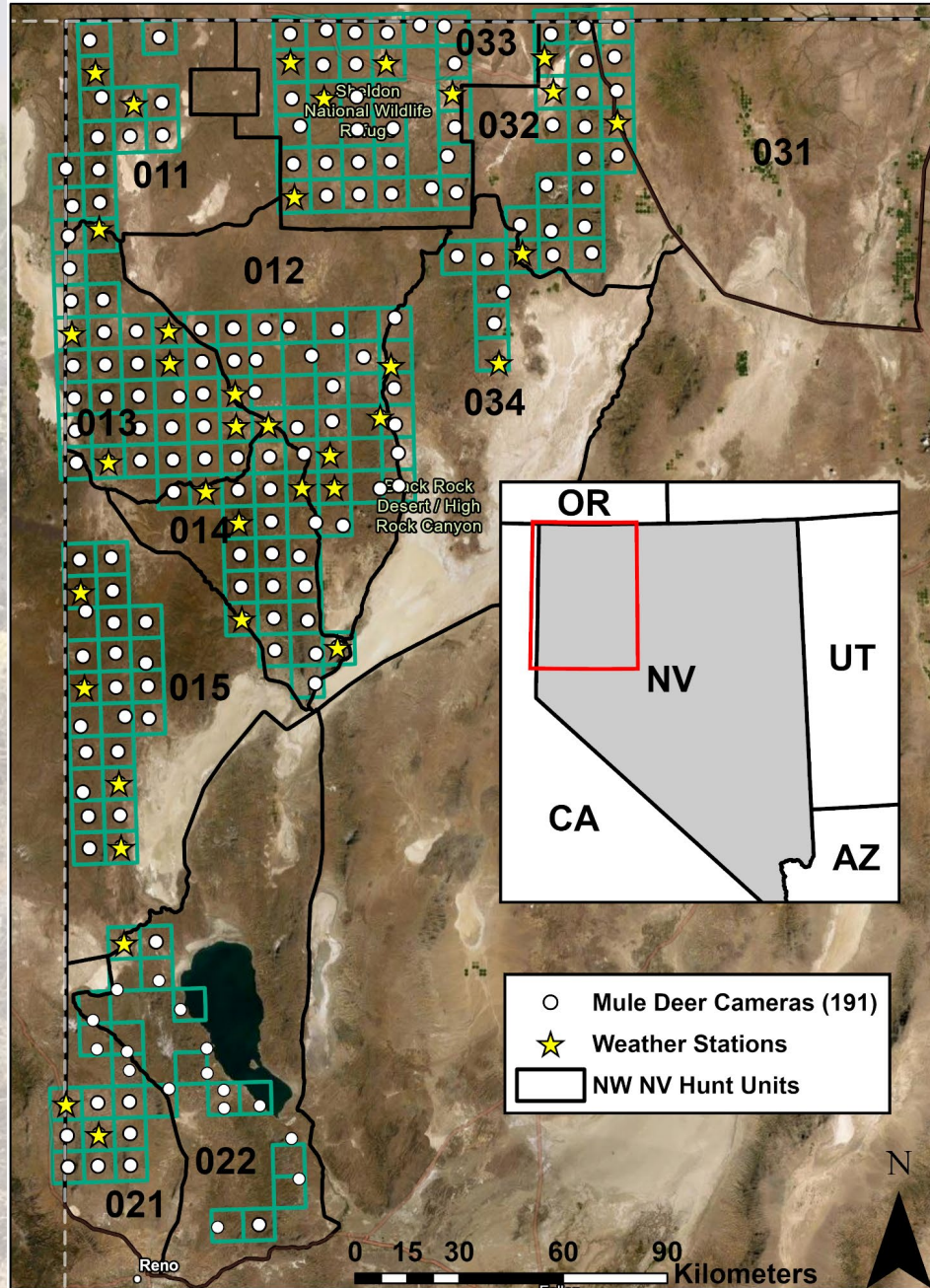
Buck 15 min = 0.049 m/s

Doe 15 min = 0.055 m/s

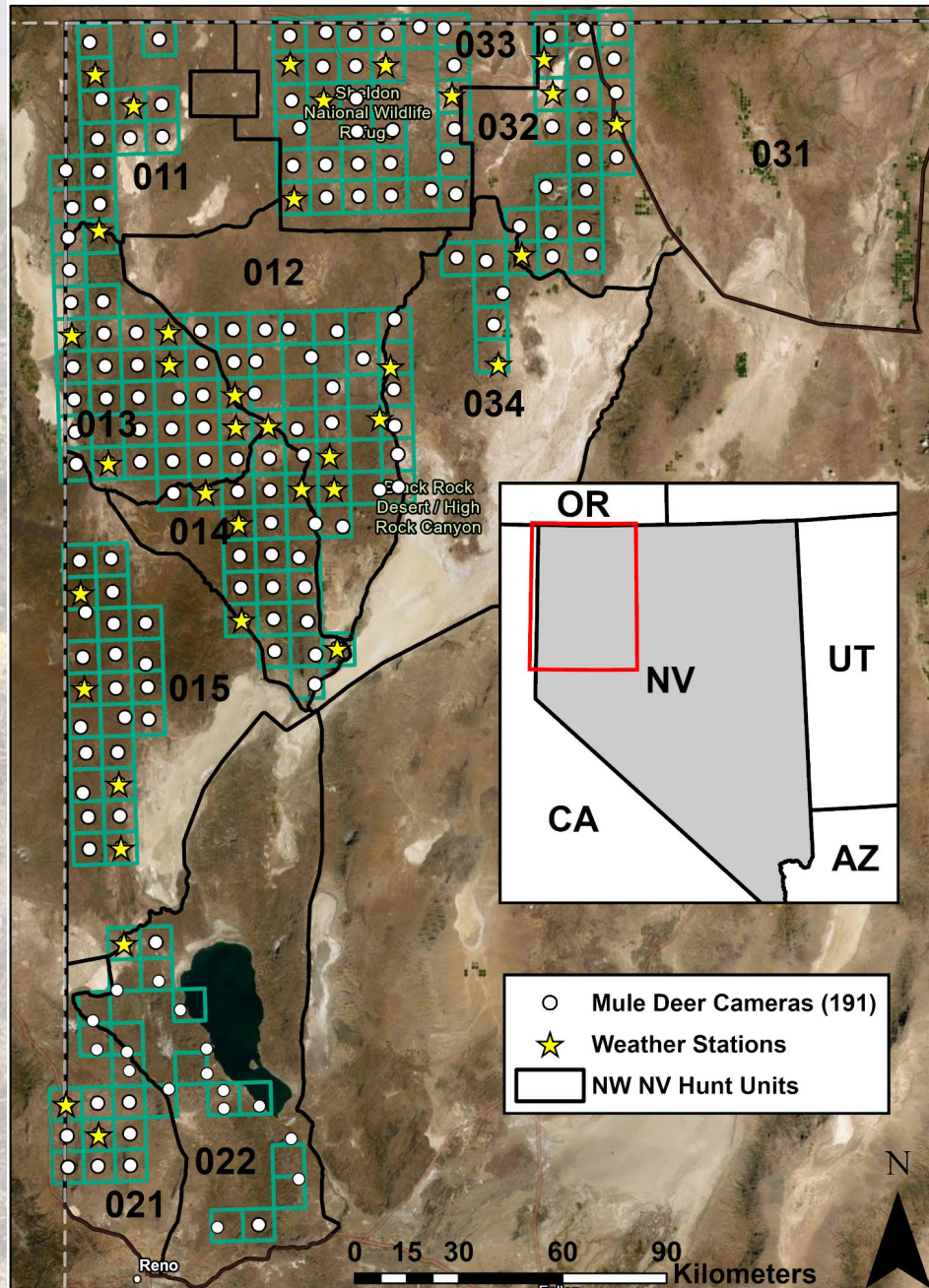
3 hr movement
Rate = 0.026m/s



Defining Study Area



Defining Study Area

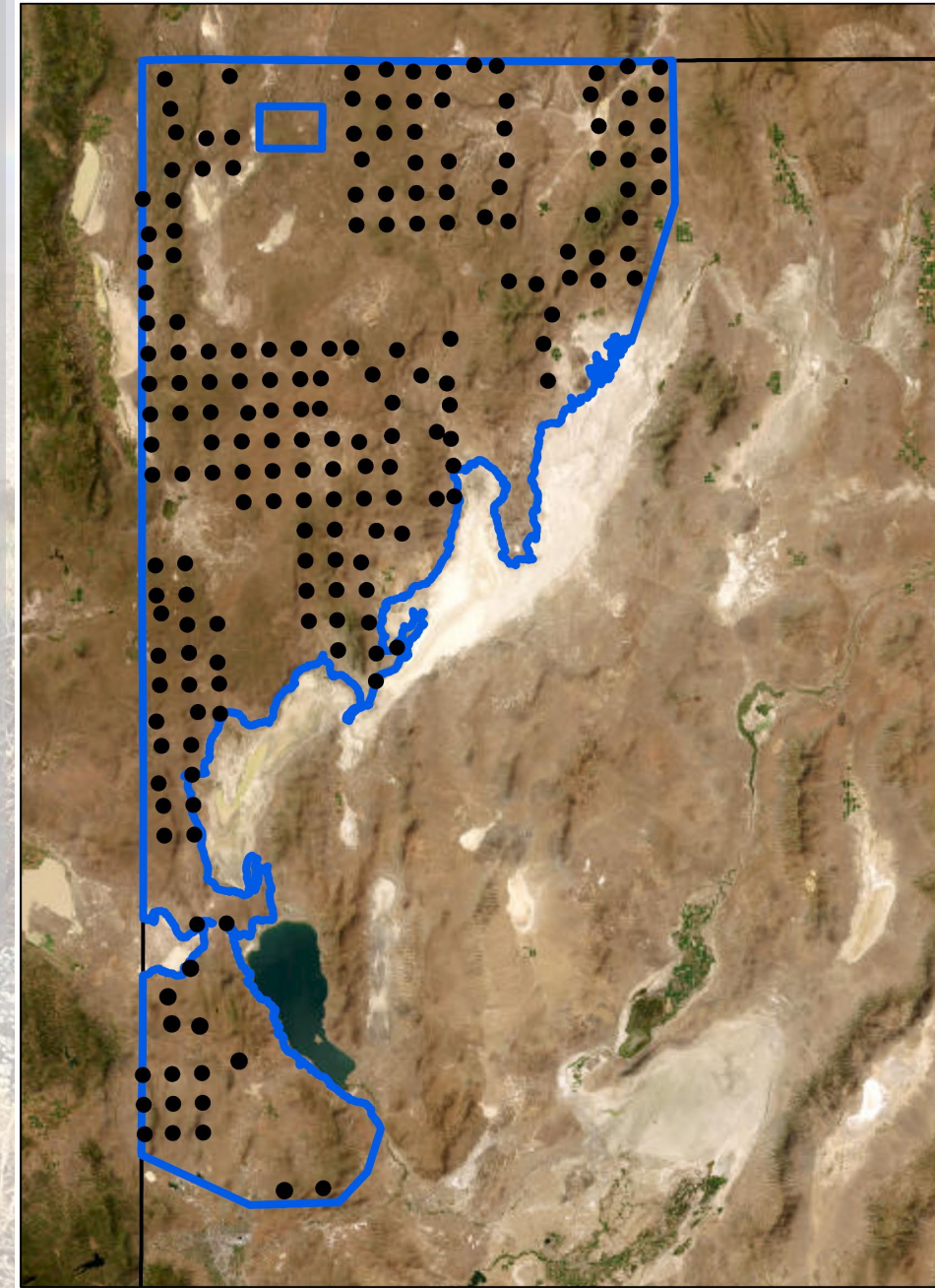


Minimum bounding polygon

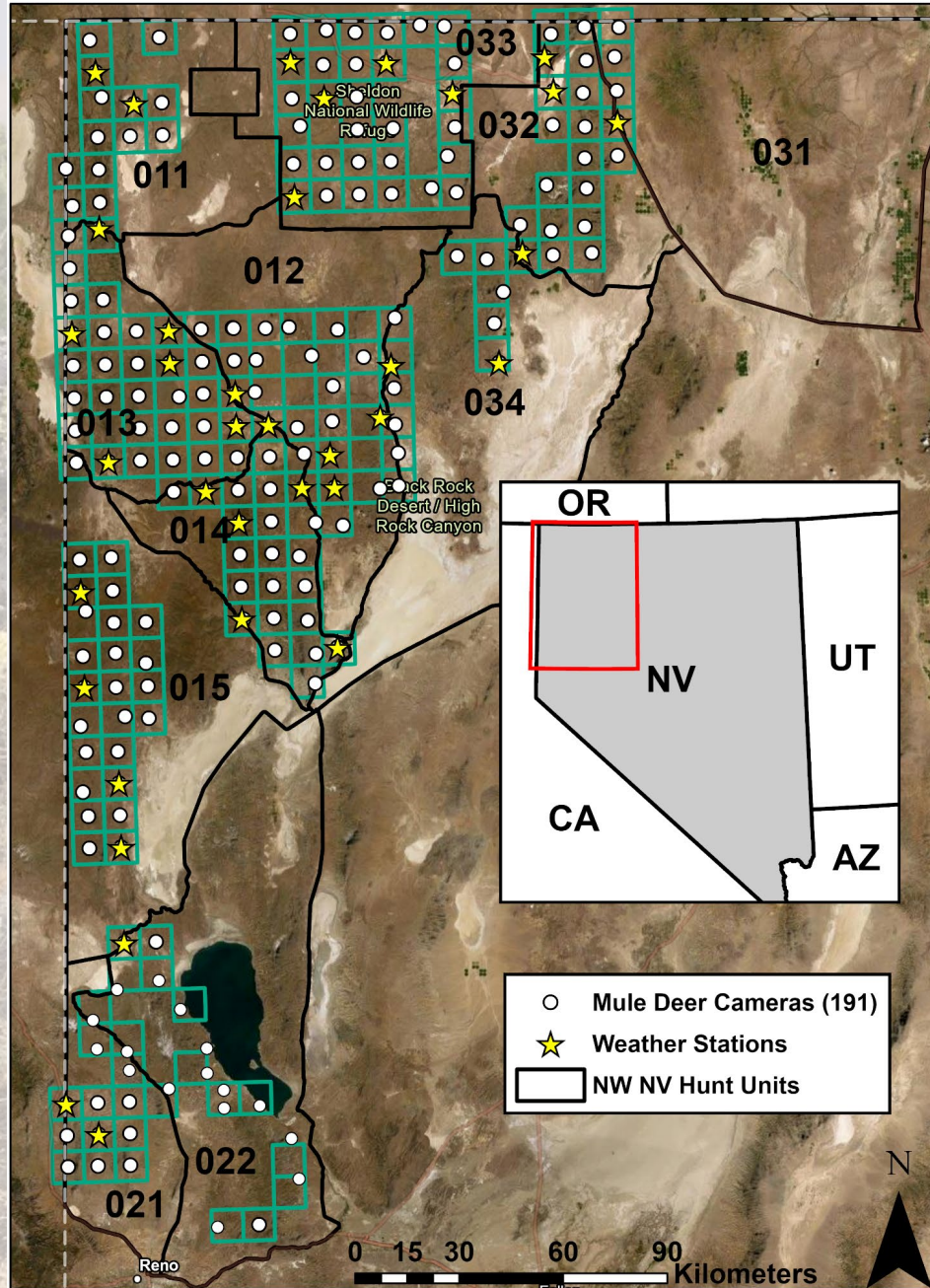
Subtracted low-elevation playas (<4,000 ft)

17,342 km²

(6,696 mi²)



Defining Study Area

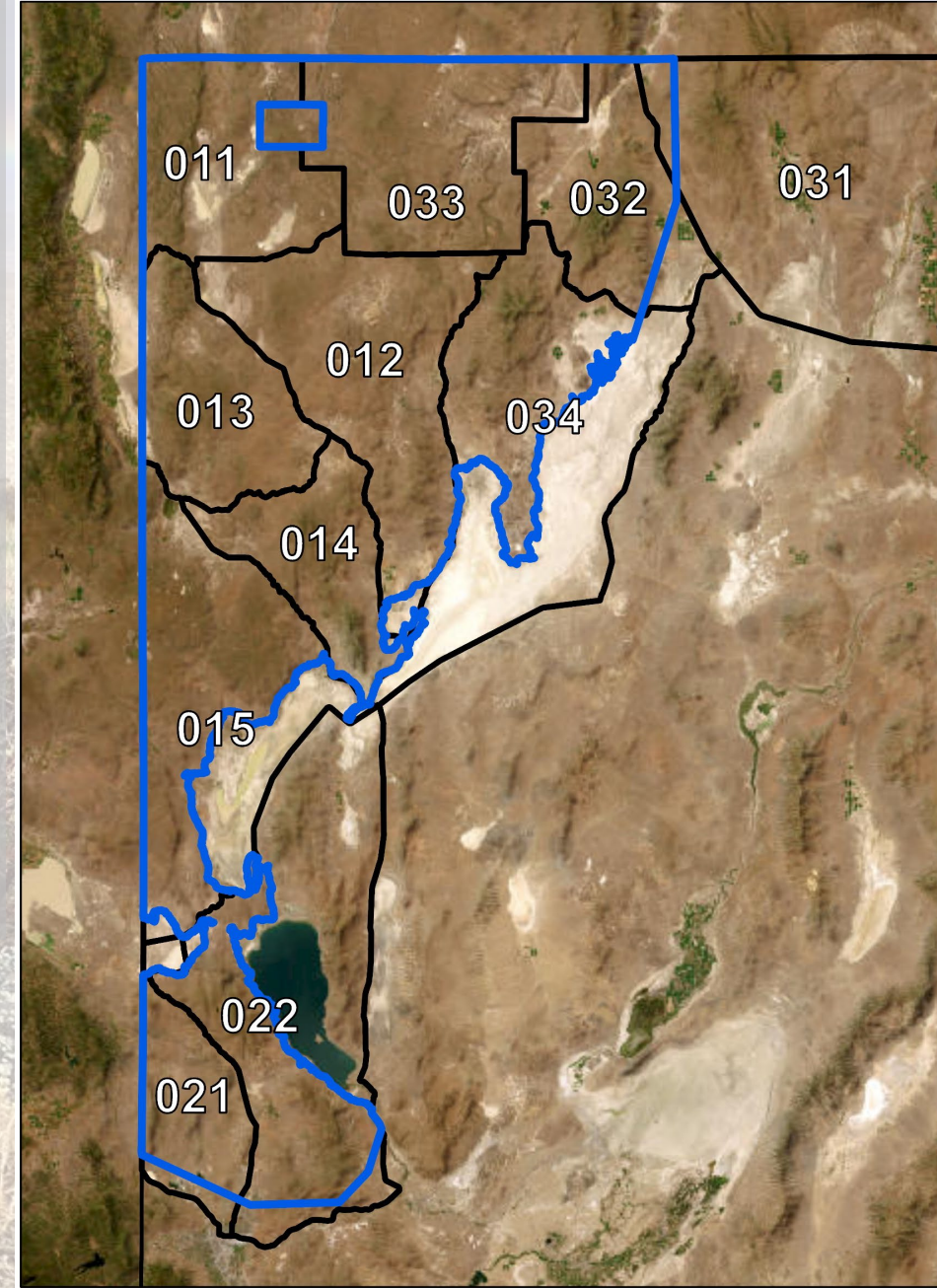


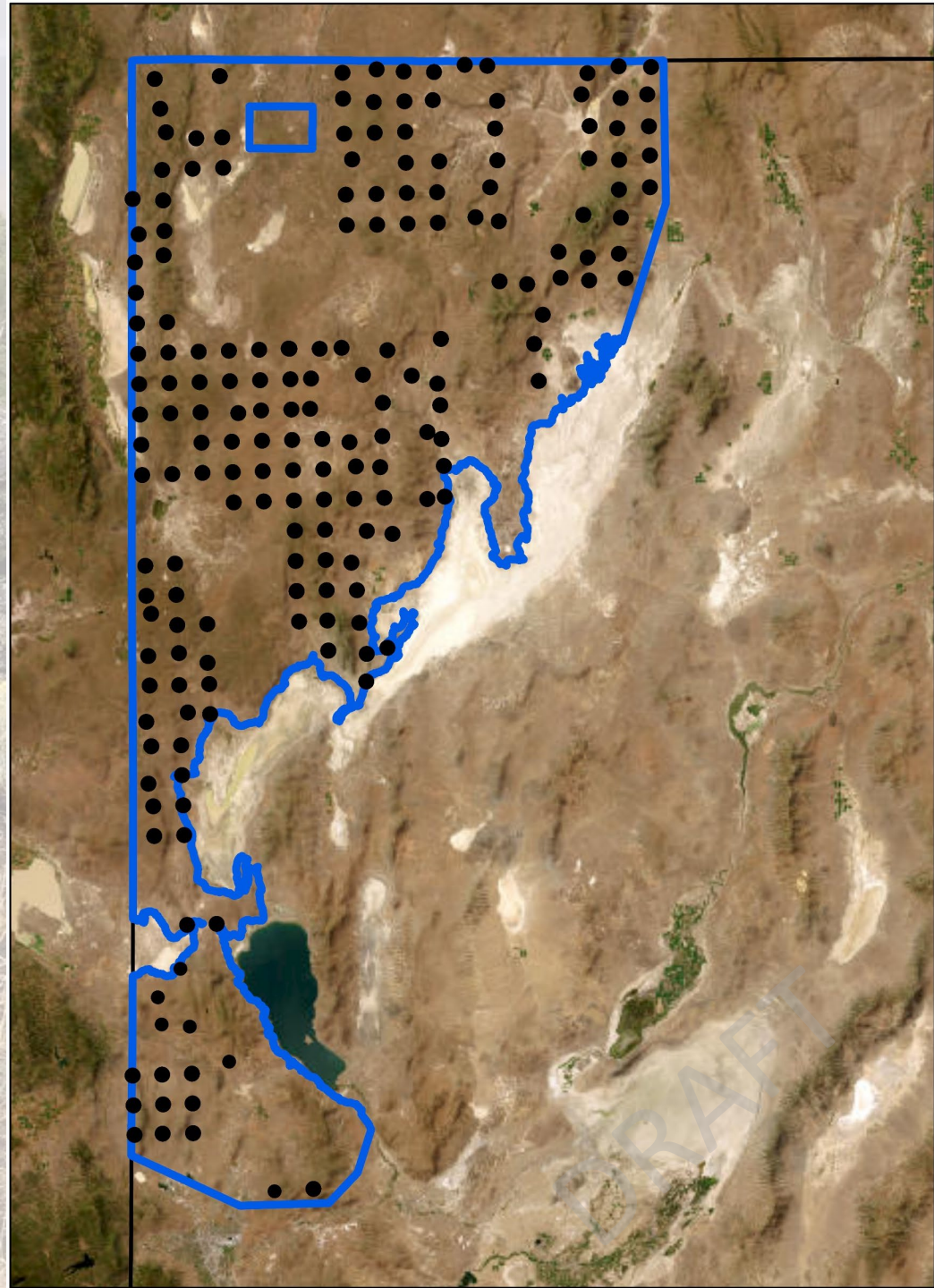
Minimum bounding polygon

Subtracted low-elevation playas (<4,000 ft)

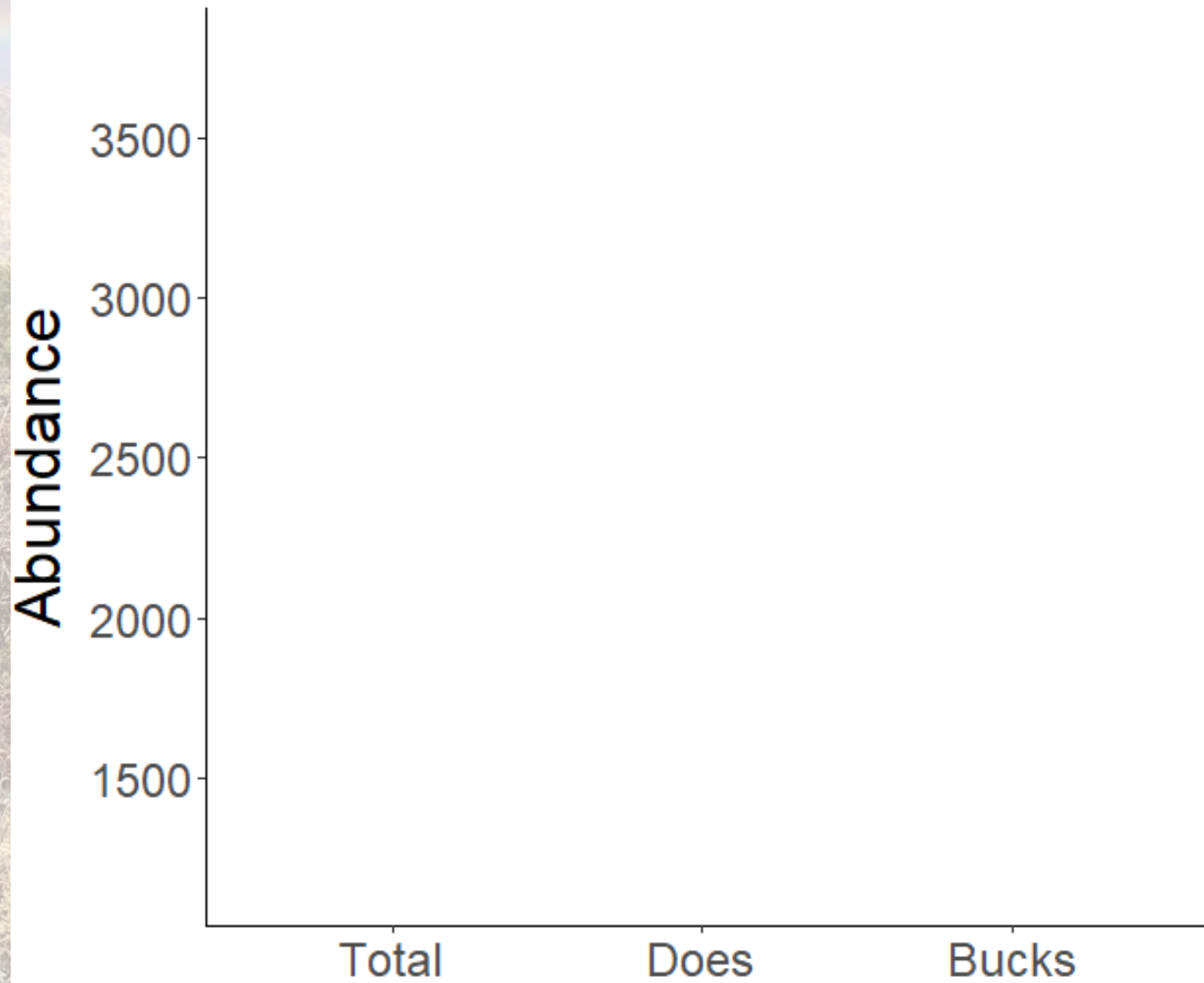
17,342 km²

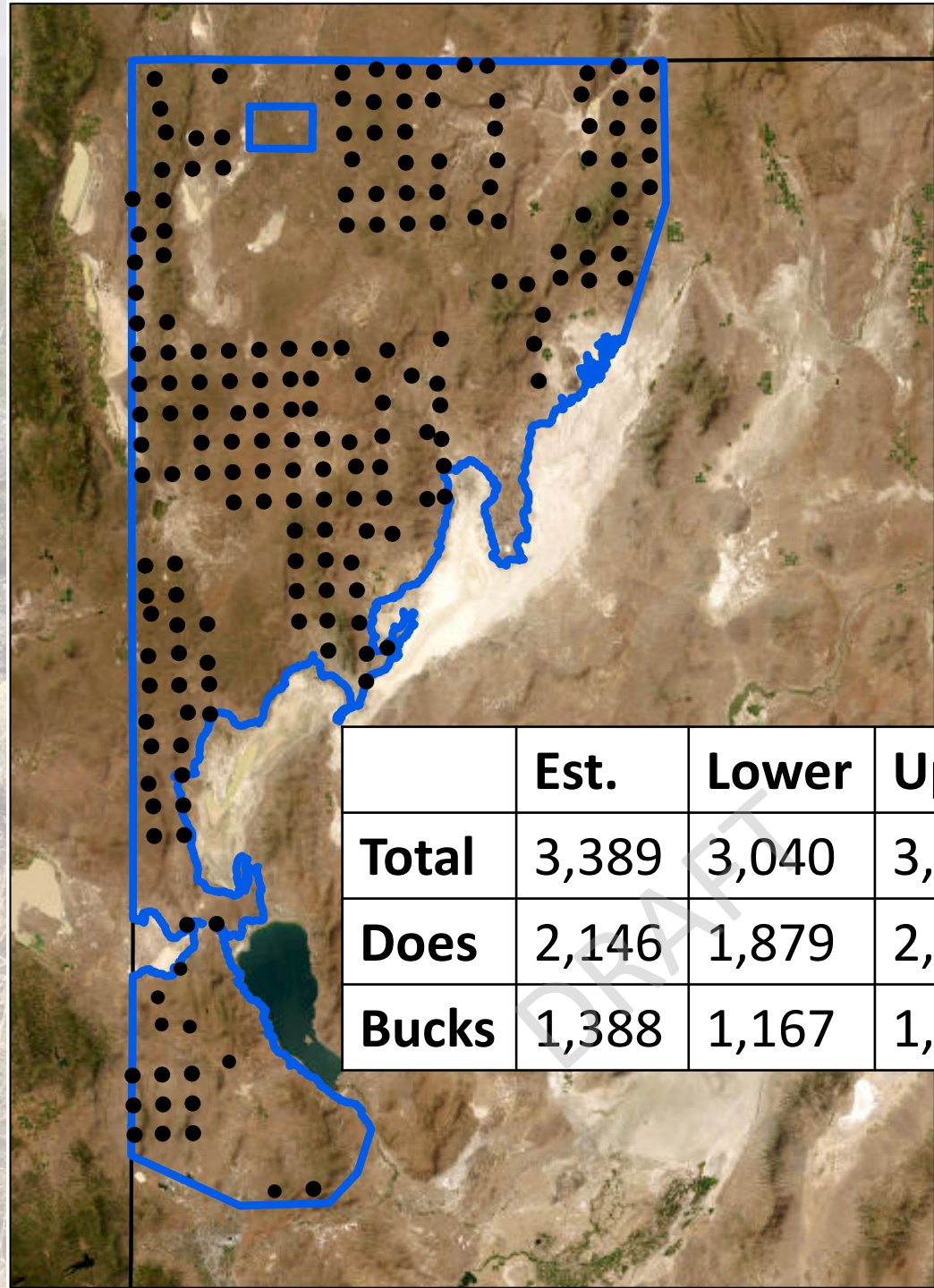
(6,696 mi²)



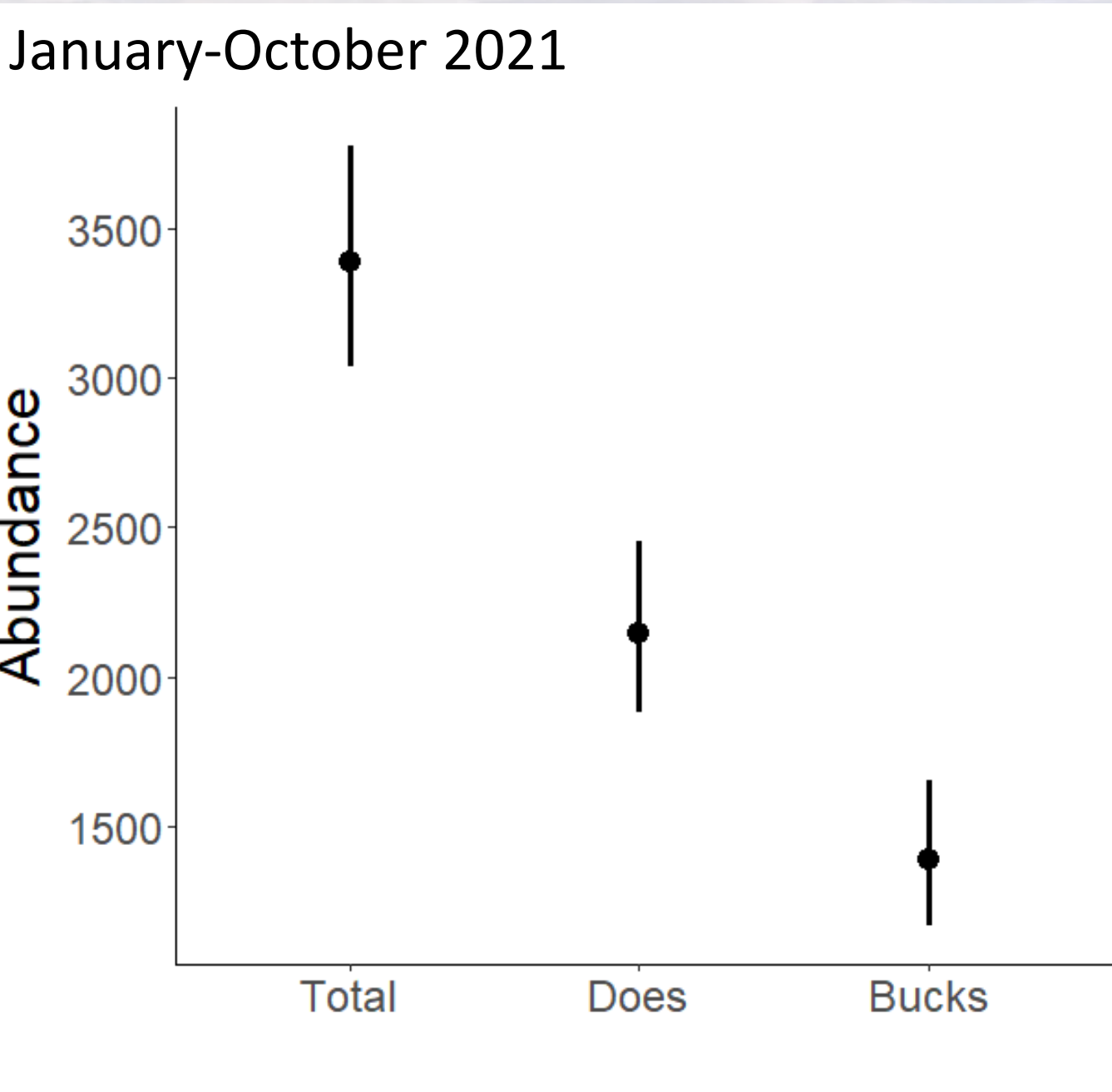


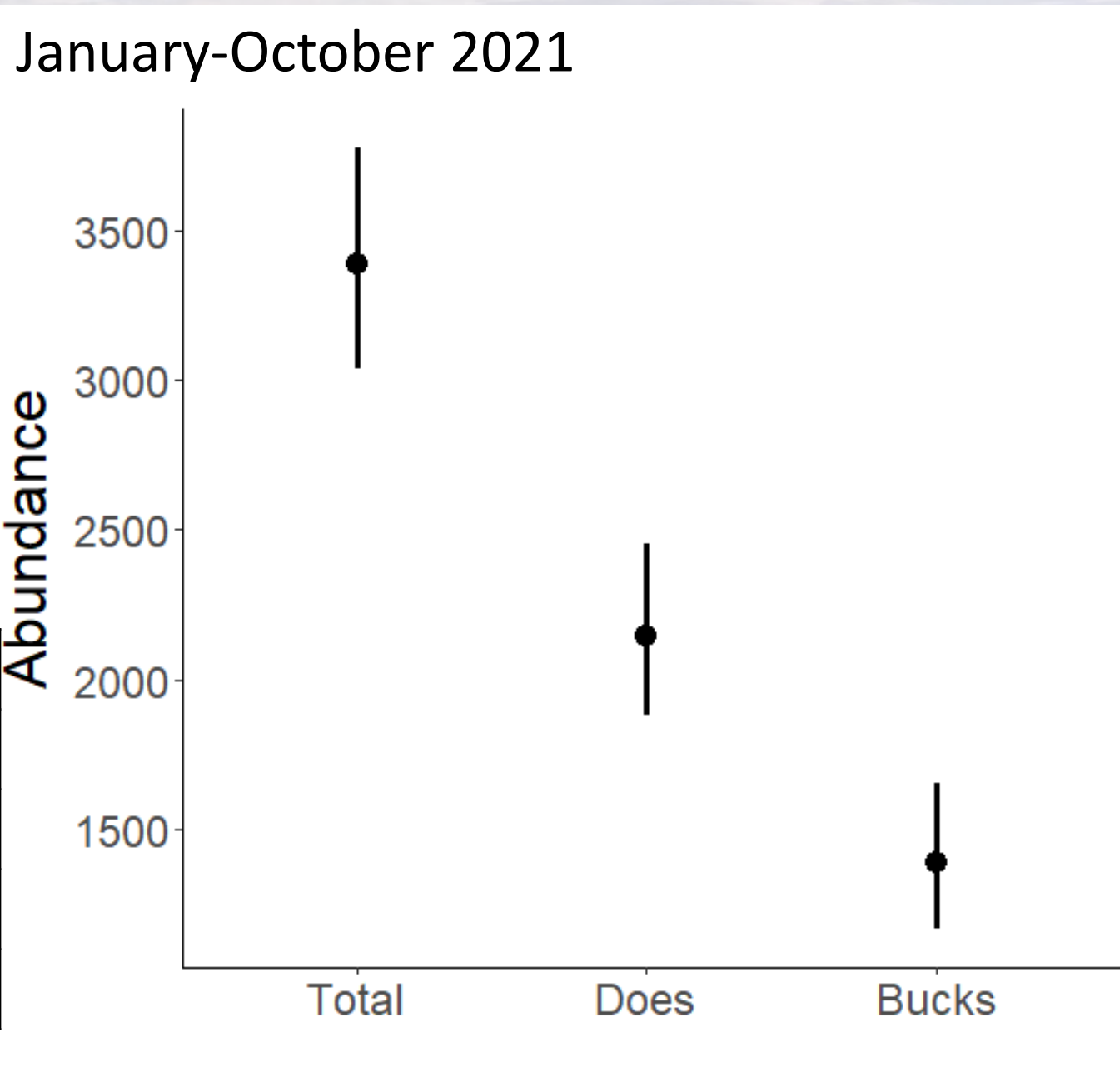
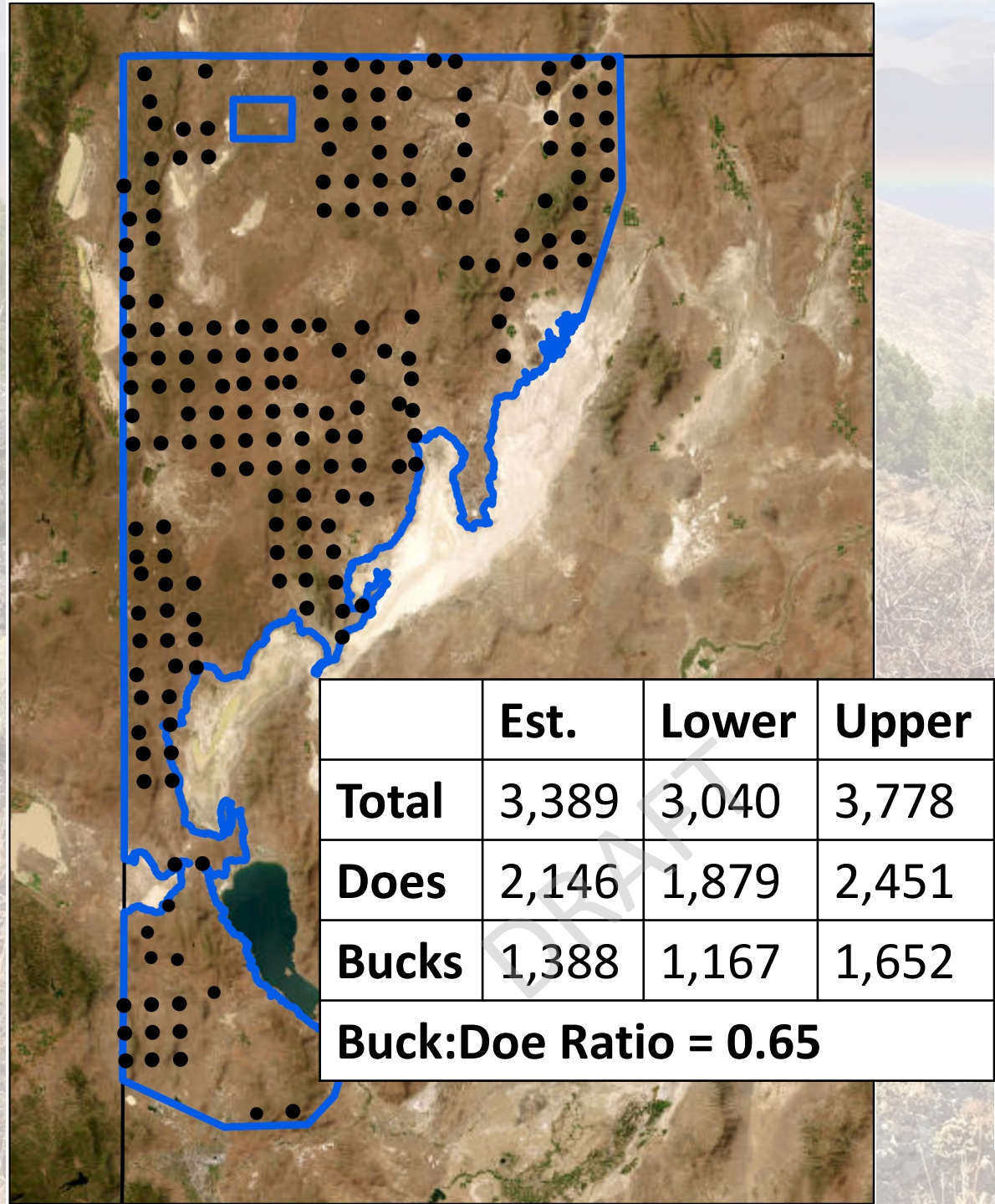
January-October 2021





	Est.	Lower	Upper
Total	3,389	3,040	3,778
Does	2,146	1,879	2,451
Bucks	1,388	1,167	1,652





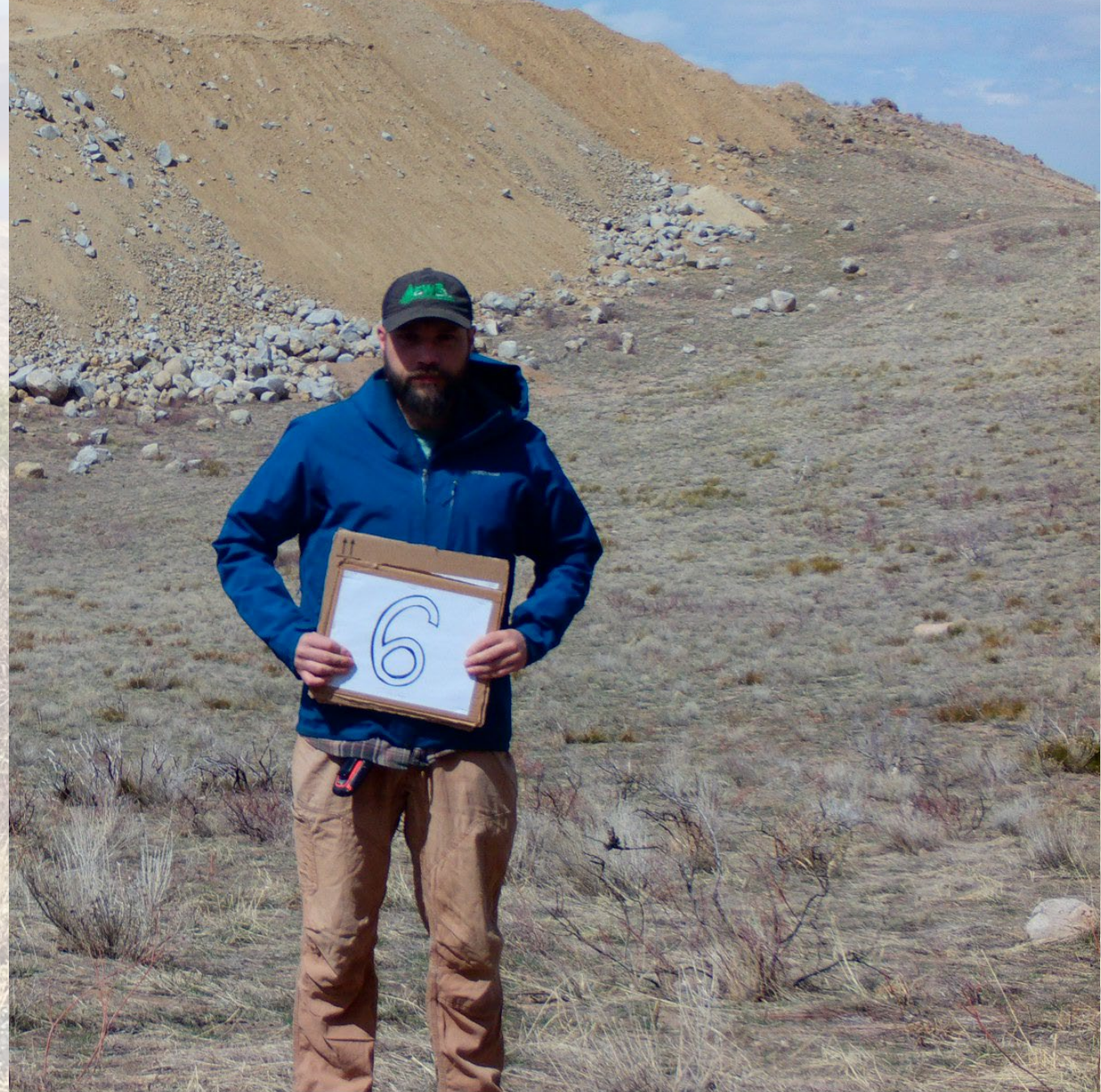
Preliminary mountain lion estimate

- 40 detections (18 sites)
- November 2020-Sept 2022
- DRAFT estimate: 110 lions (76 – 159)



Next steps

Measure each viewshed explicitly



15°C



04-19-2023

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Next steps

Measure each viewshed explicitly

Movement rate data from the entire year (especially for bucks)



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Next steps

Measure each viewshed explicitly

Movement rate data from the entire year (especially for bucks)

Fit model to additional years of data



Questions?

Time-to-event instructional video



Estimating species density and abundance with camera traps:
Time-to-event model tutorial

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UNIVERSITY OF MONTANA

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