

DESERT TORTOISE MONITORING

BCCE Post-Translocation Telemetry: Project # 2023-GBI-2030A

Range Wide Monitoring: Project # 2023-GBI-2325A



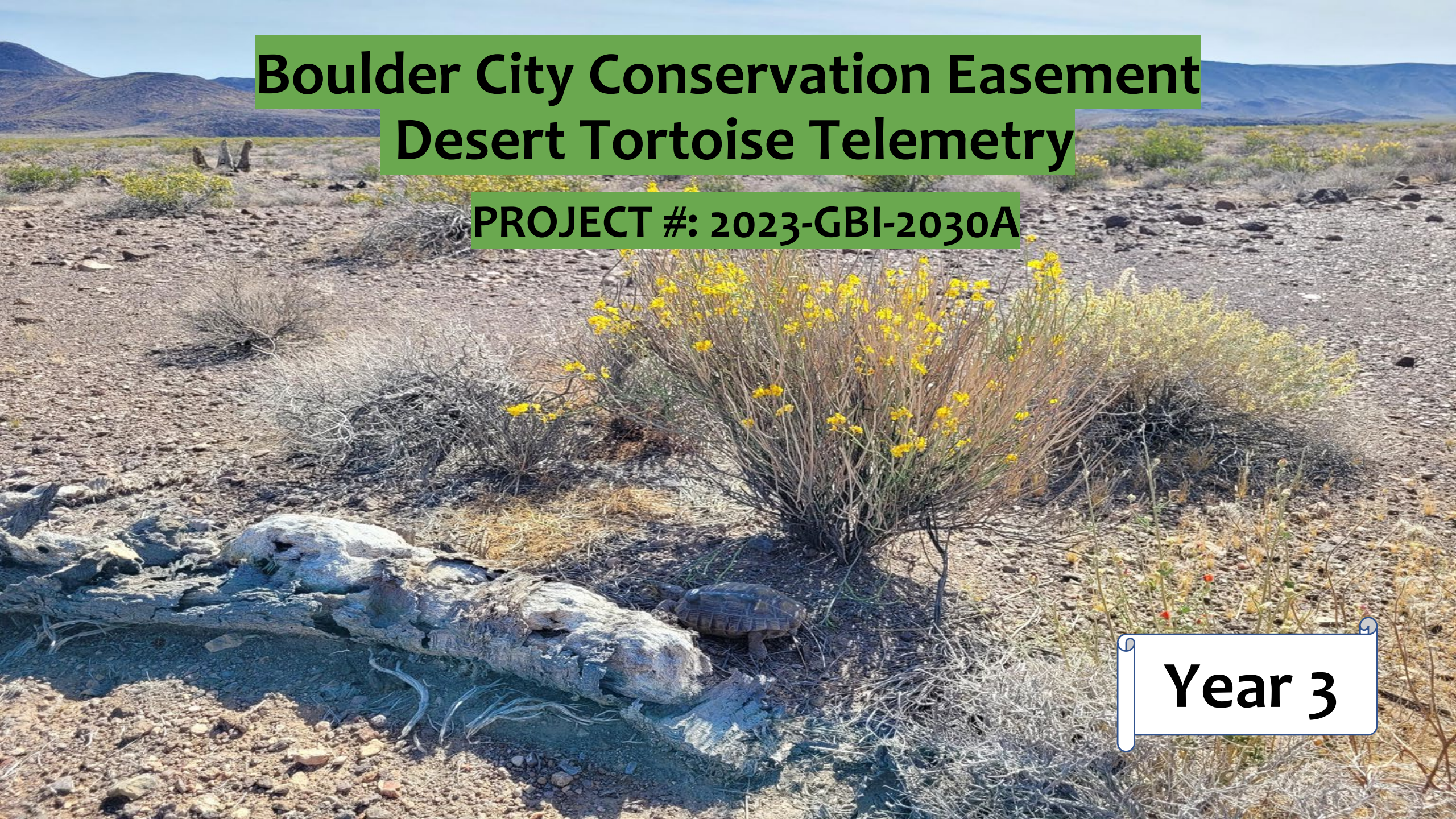
AGENCY PARTICIPANTS



Boulder City Conservation Easement Desert Tortoise Telemetry

PROJECT #: 2023-GBI-2030A

Year 3



Project Goals & Objectives



Photo credit: Keaton Wood

- The goal of this project is to monitor the overall health and movement of resident and translocated Mojave desert tortoise populations on the BCCE to allow for comparisons between the two groups.
- Objectives:
 - Track translocated and resident tortoises located in the BCCE.
 - Record mortality information to the nearest date, and record any relevant data on potential causes.

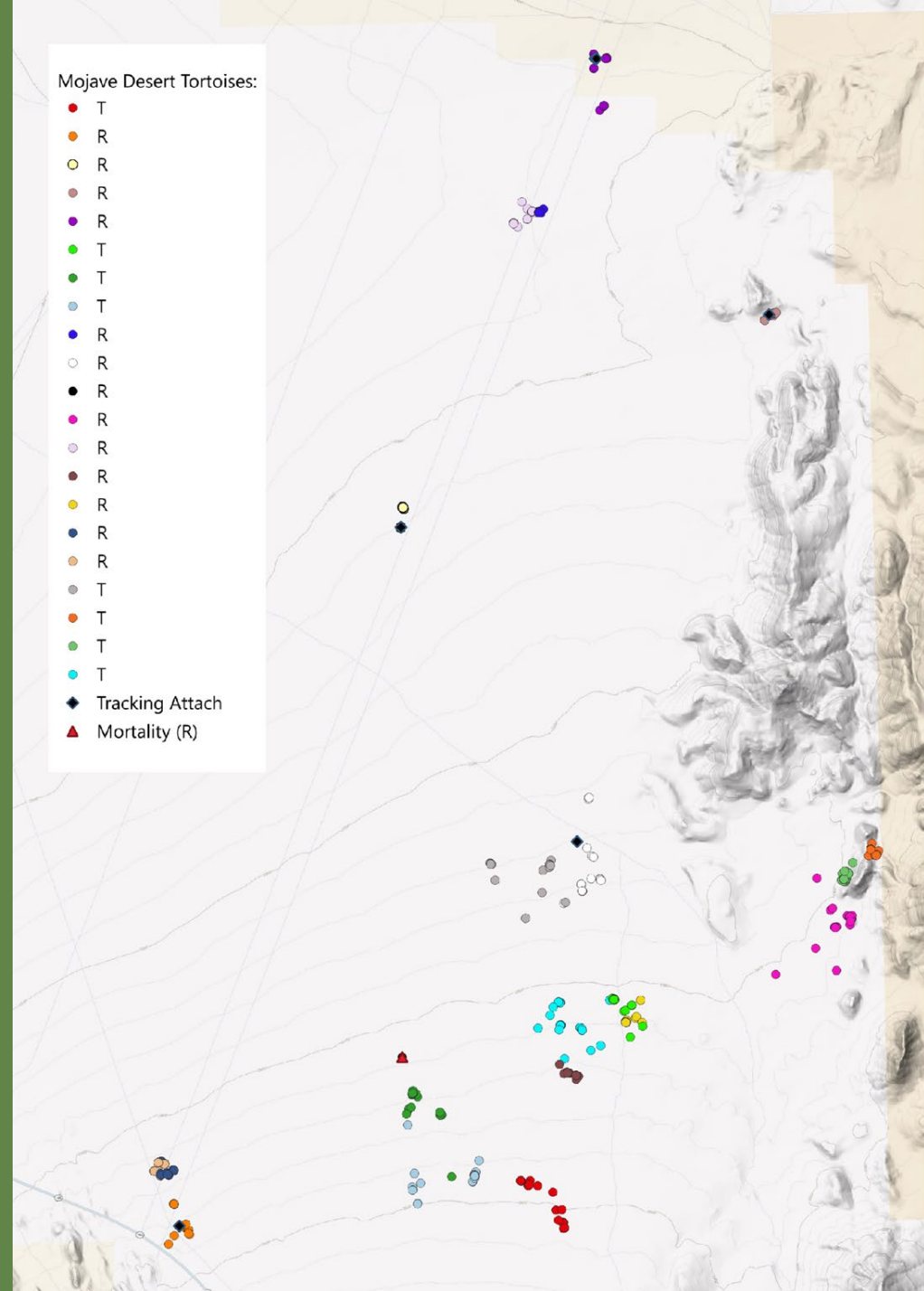


Overview

- Help understand and assess population augmentation
- Determine survivorship and movement patterns of translocated and resident desert tortoise
- Began monitoring in Oct 2014
- Weekly observations Mar-Oct
- Monthly observations Nov-Feb

BCCE 2026 Monitoring

- 21 Tortoises:
 - 12 Resident
 - 9 Translocated
- 506 Total Observations and counting



What's Next?

- Continue weekly monitoring until Oct
- Monthly monitoring through Dec
- Continued data collection for the remainder of 2026
- Annual Project Report



Photo credit: Keaton Wood



Range Wide Monitoring Project # 2023-GBI-2325A



Year 3

Overview

- Continue monitoring efforts to obtain yearly estimates of population density
- Support recovery program efforts for the Mojave desert tortoise through range-wide monitoring using Line Distance Sampling
- Monitor 3 Tortoise Conservation Area (TCA) strata



Project Goals and Objectives:

- Apply trained search techniques to accurately estimate tortoise detection probabilities and densities.
- Complete transects using prescribed methods and time requirements.
- Conduct focal telemetry concurrently with transects to support correction factor calculations.
- Implement LDS protocols on standard and non-standard transects when obstacles prevent planned routes.
- Follow QA/QC procedures to verify data, correct errors, and resolve inconsistencies



Preseason Training:

- Technicians received training on:
 - Tortoise handling and biosecurity
 - LDS protocols
 - GBI protocols
 - Desert safety
 - Wilderness First Aid
- Technicians practiced tortoise handling and data collection using live captive tortoises, with emphasis on safety, biosecurity, and data accuracy. Performance was evaluated by GBI, DCP, and FWS.

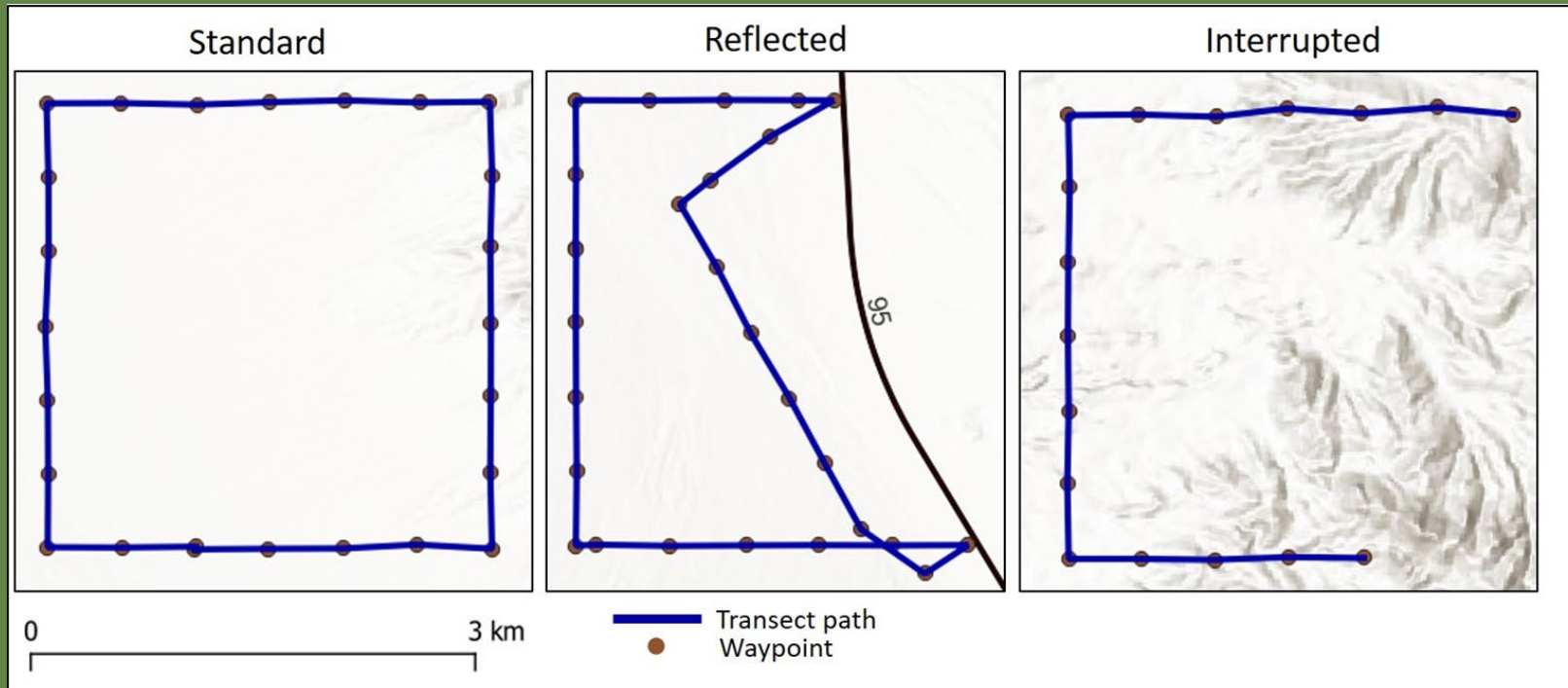


Preseason Training Continued...



- LDS training also covered GPS/compass navigation, transect setup and adjustments, obstacle procedures, data collection, and developing search skills
- Technicians completed Styrotort trials using 288 tortoise models placed along transects. Results were used to evaluate search patterns and develop individual team detection curves for post-season analysis.
- After detection trials, teams completed practice transects at the Large Scale Translocation Site (LSTS) near Jean, NV, with GBI staff reviewing data for accuracy, completeness, and consistency.

Transects:



- Randomly assigned walk order
- Transects are not perfect squares
- 12 km square transects, teams of 2 (25 meters apart)
- Reflected for stratum boundaries and man-made obstacles
- Interrupted for non surveyed terrain

2026 Transect Stats:

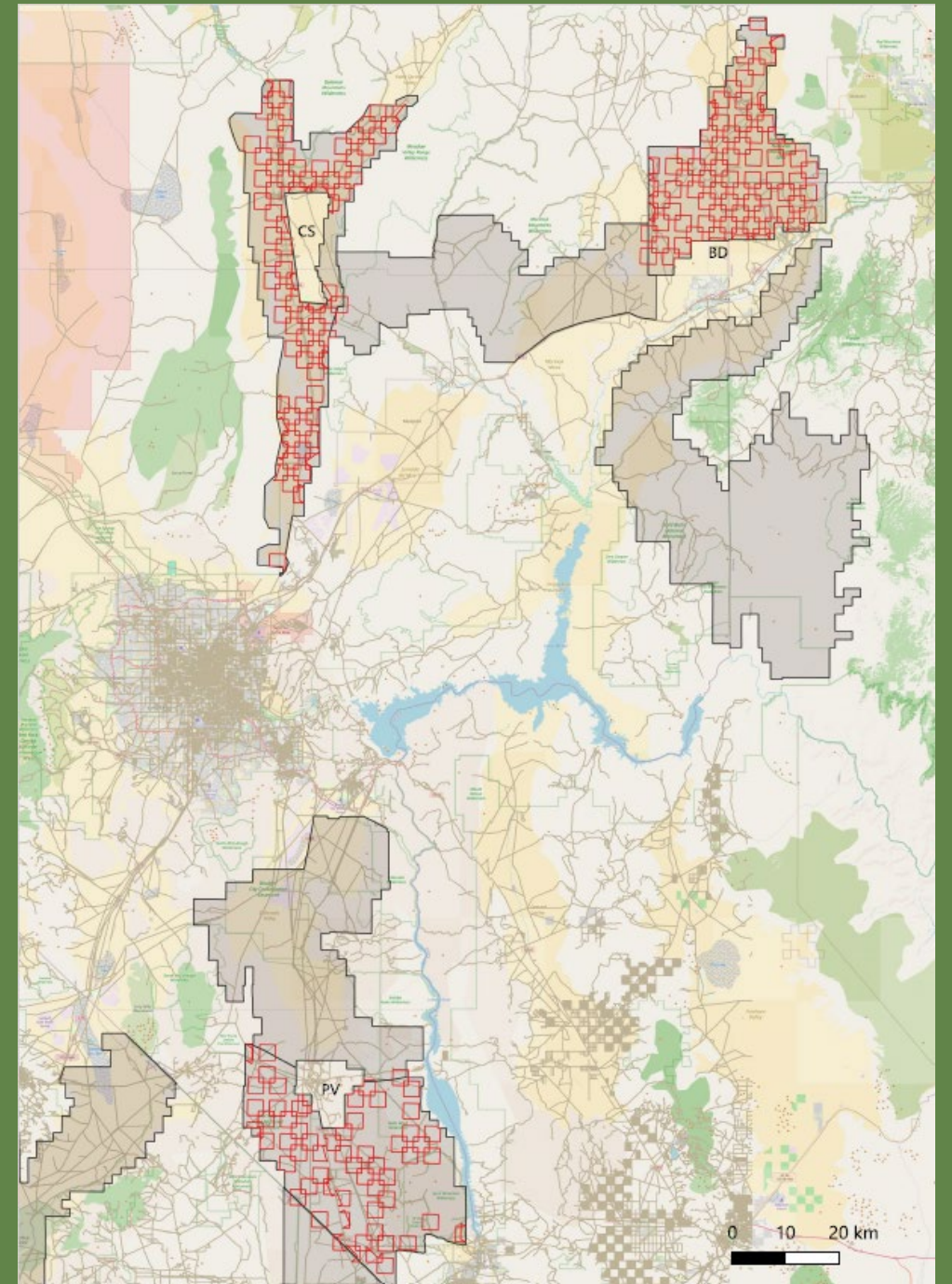
Strata: 3

Teams: 11 teams of 2 with 2 Go Telemetry Techs

Number of Transects: 213

Number of Transects w/ Segments: 348

Waypoints: 5398



Observations:



- April 7 - May 12
- 213 assigned transects
- 69 live tortoises
 - 53 transect
 - 16 opportunistic
- 115 tortoise carcasses
 - 109 transect
 - 6 opportunistic

Stats broken down by stratum:

Stratum	Transect Tortoises	Opportunistic Tortoises	Total Tortoises
Piute Valley	24	11	35
Coyote Springs	19	3	22
Beaver Dam Slope	10	2	12
Total	53	16	69

Stratum	Transect Carcasses	Opportunistic Carcasses	Total Carcasses
Piute Valley	44	0	44
Coyote Springs	49	6	55
Beaver Dam Slope	16	0	16
Total	109	6	115

Comparing Strata Over Time:

2024

Stratum	Transect Tortoises	Opportunistic Tortoises	Total Tortoises
Piute Valley	12	2	14
Coyote Springs	29	5	34
Beaver Dam	11	3	14
Total	52	10	62

Stratum	Transect Carcasses	Opportunistic Carcasses	Total Carcasses
Piute Valley	39	1	40
Coyote Springs	28	5	33
Beaver Dam	1	2	3
Total	68	8	76

Live tortoises:

PV: 14

CS: 34

BD: 14

Total: 62

Tortoise Carcasses:

PV: 40

CS: 33

BD: 3

Total: 76

2026

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Total	109	6	115

Live tortoises:

PV: 35

CS: 22

BD: 12

Total: 69

Tortoise Carcasses:

PV: 44

CS: 55

BD: 16

Total: 115

Live Observations – Data Collected

- Location/visibility
- Midline Carapace Length (MCL)
- Body Condition Score (BCS)
- Nares (appearance and discharge)
- Tags
 - Unmarked tortoises were tagged when possible
- Minimum handling



Carcass Observations – Data Collected



- Intact or disarticulated
- Tags/ID
- Sex and MCL when possible

G_o Telemetry

- Conducted at 2 sites:
 - Piute-Mid
 - Halfway Wash
- To estimate the proportion of tortoises active or visible during transect surveys
- Data was used to calibrate the results of transect surveys

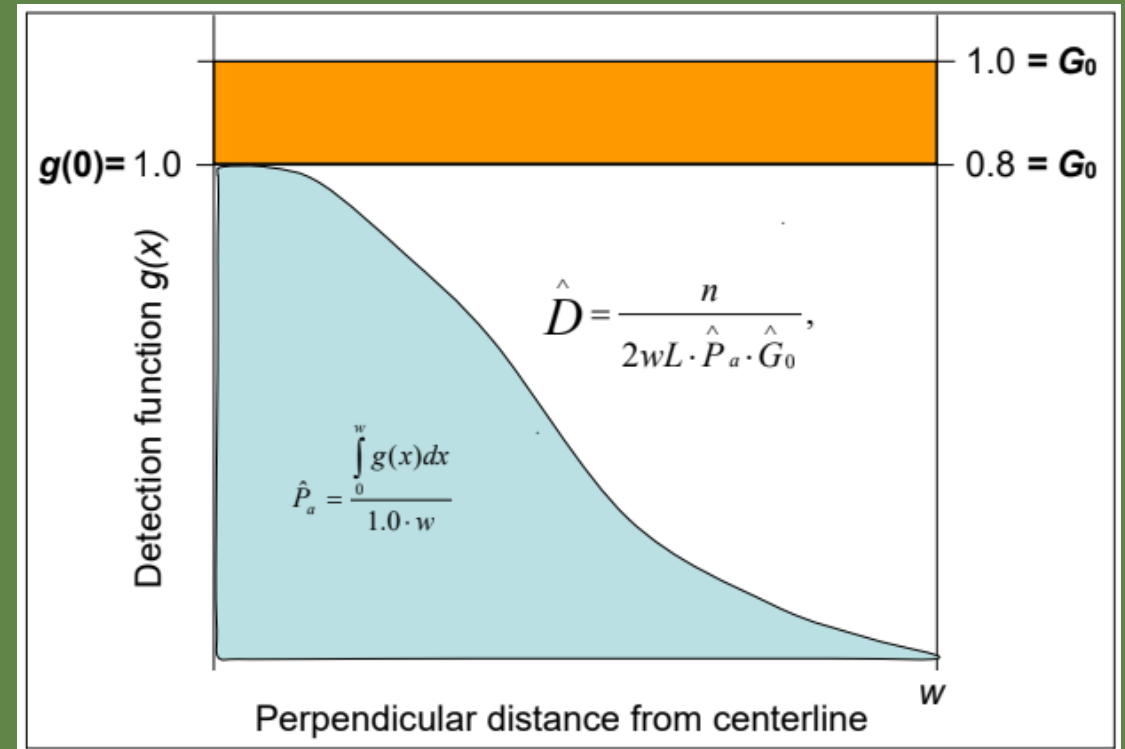


G₀ Telemetry

Density Estimates:

$$\hat{D} = \frac{n}{2wL \cdot \hat{P}_a \cdot \hat{G}_0}$$

- Km walked: L
- Perpendicular distance from transect line: w
- Probability of detection: $\hat{P}_a$
 - Used because tortoises close to the transect line are more likely to be detected than objects farther from the line
 - Critical assumption: Tortoises on the transect centerline are detected 100 % of the time
- Number of tortoises observed: n
- To account for population above ground/visible in burrows: $\hat{G}_0$



G₀ Telemetry Stats

Stratum	Transmitter Equipped Tortoises	Days Surveyed	Observations	Average Observations per Day
Piute-Mid	10	6	227	37.8
Halfway Wash	10	16	495	30.9
Total	20	22	722	32.8



Upcoming

- Final 2026 Deliverables & Milestones
- Next season's recruitment set to begin late fall/early winter
- 2027 field season to begin in early March!



This wouldn't be possible without

- Scott Cambrin
- Corey Mitchell
- Taryn Cornell
- Tortoise Group
- RW Crews
- Telemetry Technicians
 - Nick Mendelsohn, Keaton Wood, Brent Sparks, Marti Leake, and Vinnie Del Conte
- Thank you for all of your help & hard work this year!!





QUESTIONS?

