APACHE MOUNTAINS MULE DEER PROJECT

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Introduction

- Mule deer are becoming more popular in the state of Texas
- Very few studies of any type on mule deer in the Trans Pecos

Project Objectives

- Basic mule deer ecology
- Annual & seasonal home ranges
- Effects of supplemental feed on home ranges
- Determine daily movement patterns
- Evaluate habitat use
- Effects of supplemental feed and water on habitat use
- Better understanding of antler development
- Aging techniques from teeth wear and replacement and cementum annuli
- Comparison of deer density, fawn production, & sex ratios between fed and non-fed sites

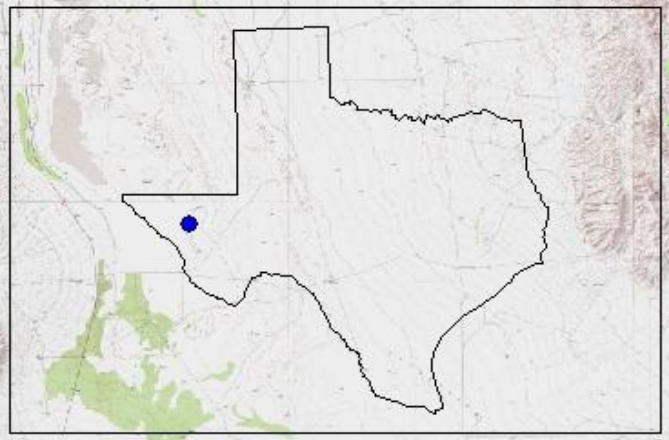
Today's Focus

- Annual & Seasonal Home Ranges
- Effects of supplemental feed on home range and habitat use

Previous Studies

- Brewster Co. (Lawrence et al. 1994)
  - Male mule deer had home ranges of 4.3 square miles (2,750 ac)
- Longfellow Ranch – Pecos Co (Wampler 1980)
  - Male mule deer had home ranges of 3.0 square miles (1,920 ac)

Study Site



7 Hearts

Jobe

Apache

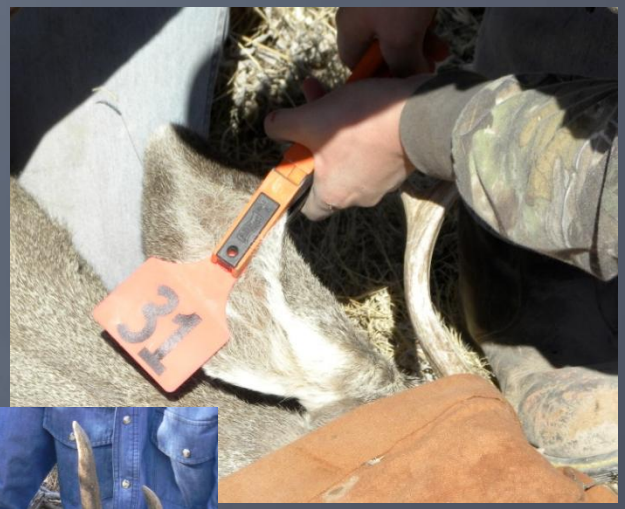
Van Horn

Kent

0 1.5 3 6 9 12 15 18 Miles

Methods

- Deer were captured annually from 2006-2010
- Animals were aged based on teeth wear
- Antler measurements taken using Gross B&C method
- GPS collars were placed around neck
  - Collected data every 5 hours



Methods

- GPS Collars remained on deer from 1-4 years.
- Collar data was then entered into ArcGIS for spatial analysis
- Hawths Tools was used to determine home range size
  - 50% Fixed Kernel (Core Area)
  - 95% Fixed Kernel (Home Range)

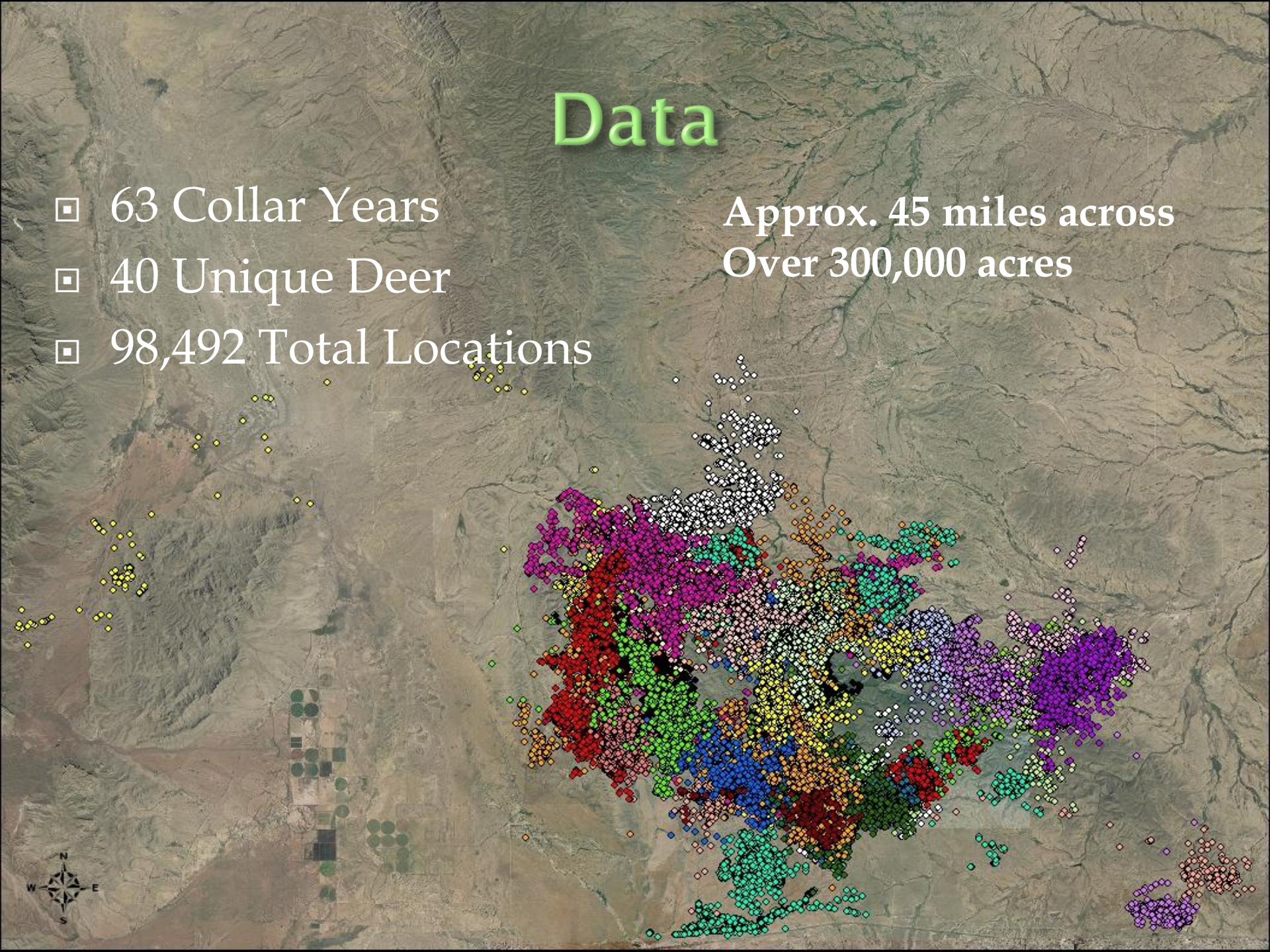
Methods

- An Annual Home Range was determined
  - March 1 – February 28
- 4 Seasonal Home Ranges were determined
  - Spring (March 1 – May 31)
  - Summer (June 1 – August 31)
  - Fall (September 1 – November 30)
  - Winter (December 1 – February 28) – Includes breeding season

Data

- 63 Collar Years
- 40 Unique Deer
- 98,492 Total Locations

Approx. 45 miles across
Over 300,000 acres



Results

- Ranches
  - Apache
  - Jobe
- Years
  - 2006 -2010
- Seasons
  - Spring, Summer, Winter, Fall
- Age
  - 4 – 8 years of age

Apache vs. Jobe Annual Mule Deer Home Ranges (95% Kernel)

	2006	2007	2008	2009	2010
Apache	10,708	9,143	7,371	7,190	8,974
Jobe	11,026	9,202	11,249	15,152	

Seasonal Home Ranges Of Mature Mule Deer Bucks On The Apache Ranch From 2006-2010

	Spring	Summer	Fall	Winter	Annual
2006	7,787	7,347	7,067	8,739	10,708
2007	7,760	6,966	5,213	7,269	9,143
2008	6,238	5,526	4,256	7,641	7,371
2009	4,922	5,372	4,952	8,319	7,190
2010	6,804	5,337	4,577	11,285	8,974

Seasonal Home Ranges Of Mature Mule Deer Bucks On The Jobe Ranch From 2006-2010

Acres

	Spring	Summer	Fall	Winter	Annual
2006	7,134	7,099	6,232	10,439	11,026
2007	7,550	5,846	6,511	7,446	9,202
2008	8,648	7,496	6,561	11,297	11,249
2009	9,180	6,684	5,984	10,892	15,152

Apache vs Jobe Average Seasonal Home Ranges From 2006-2010 (95% Kernel)

	Spring	Summer	Fall	Winter	Annual
Apache	6,839	6,014	5,097	8,970	8,723
Jobe	7,845	6,942	6,350	10,157	11,130

J 1 2008 Seasonal Home Ranges

Legend

J 1

PERCENT

50 (5,594 ac)

95 (23,760 ac)

100 (73,505 ac)

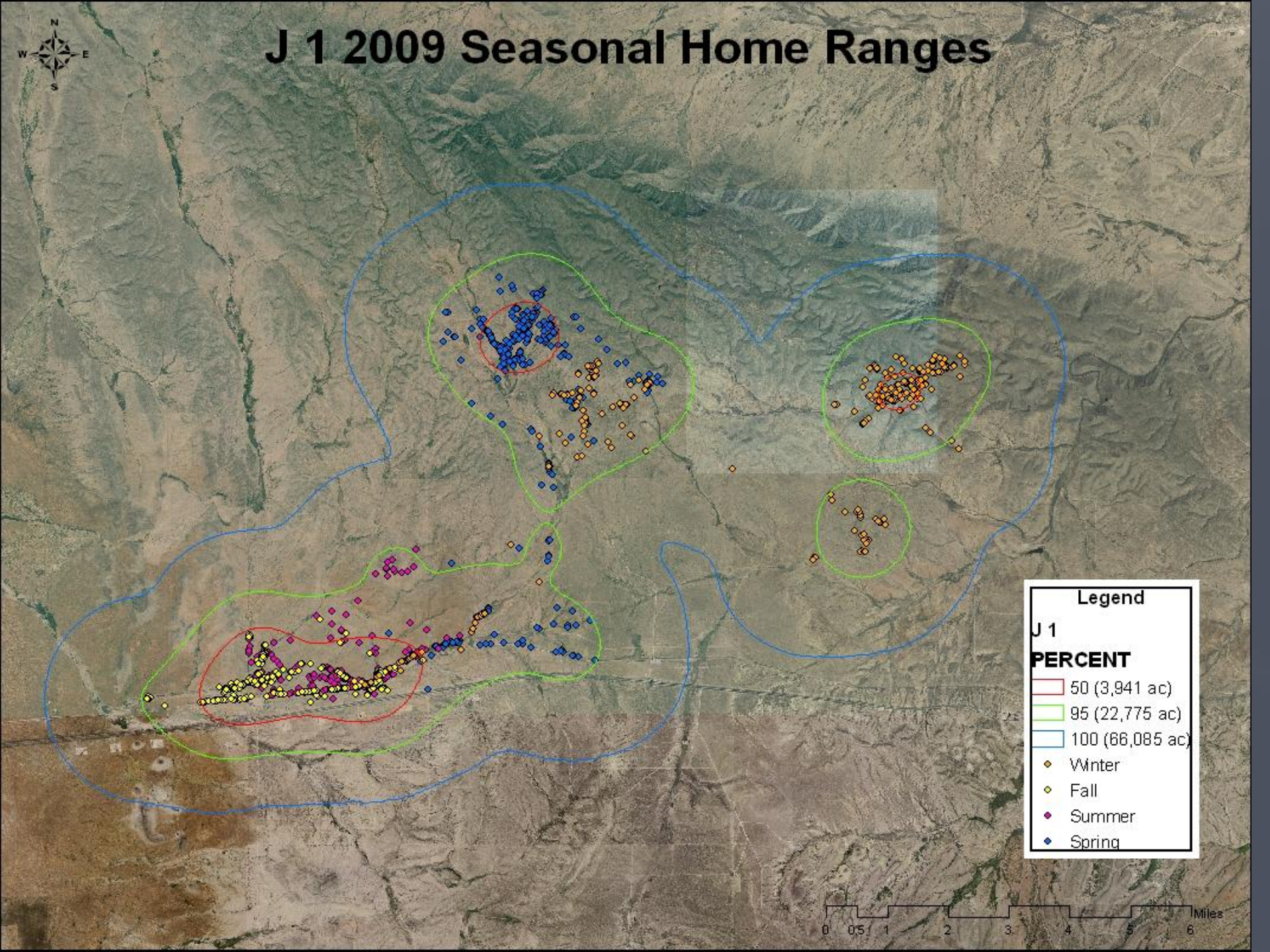
Winter

Fall

Summer

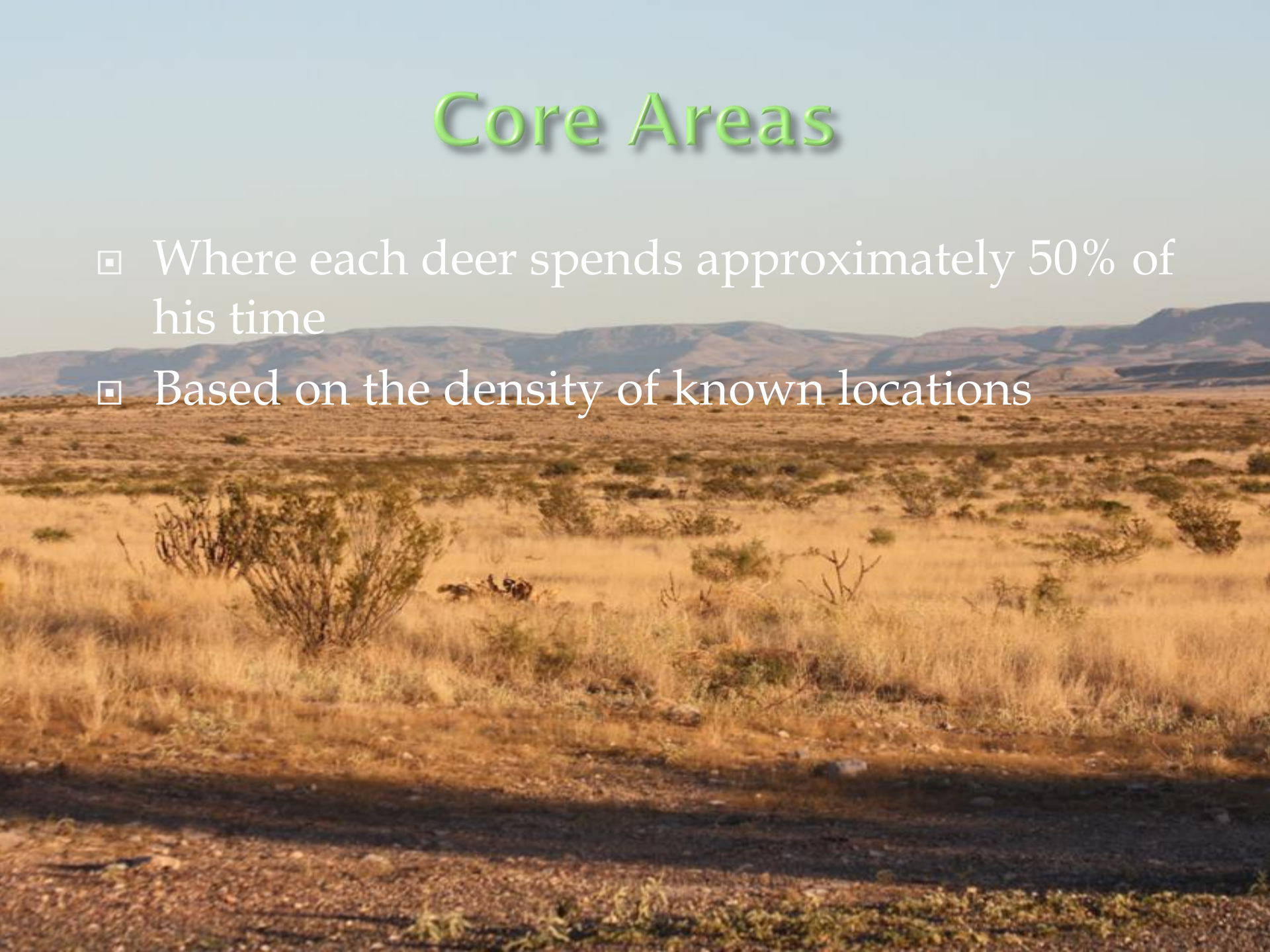
Spring

0 0.5 1 2 3 4 5 6 Miles

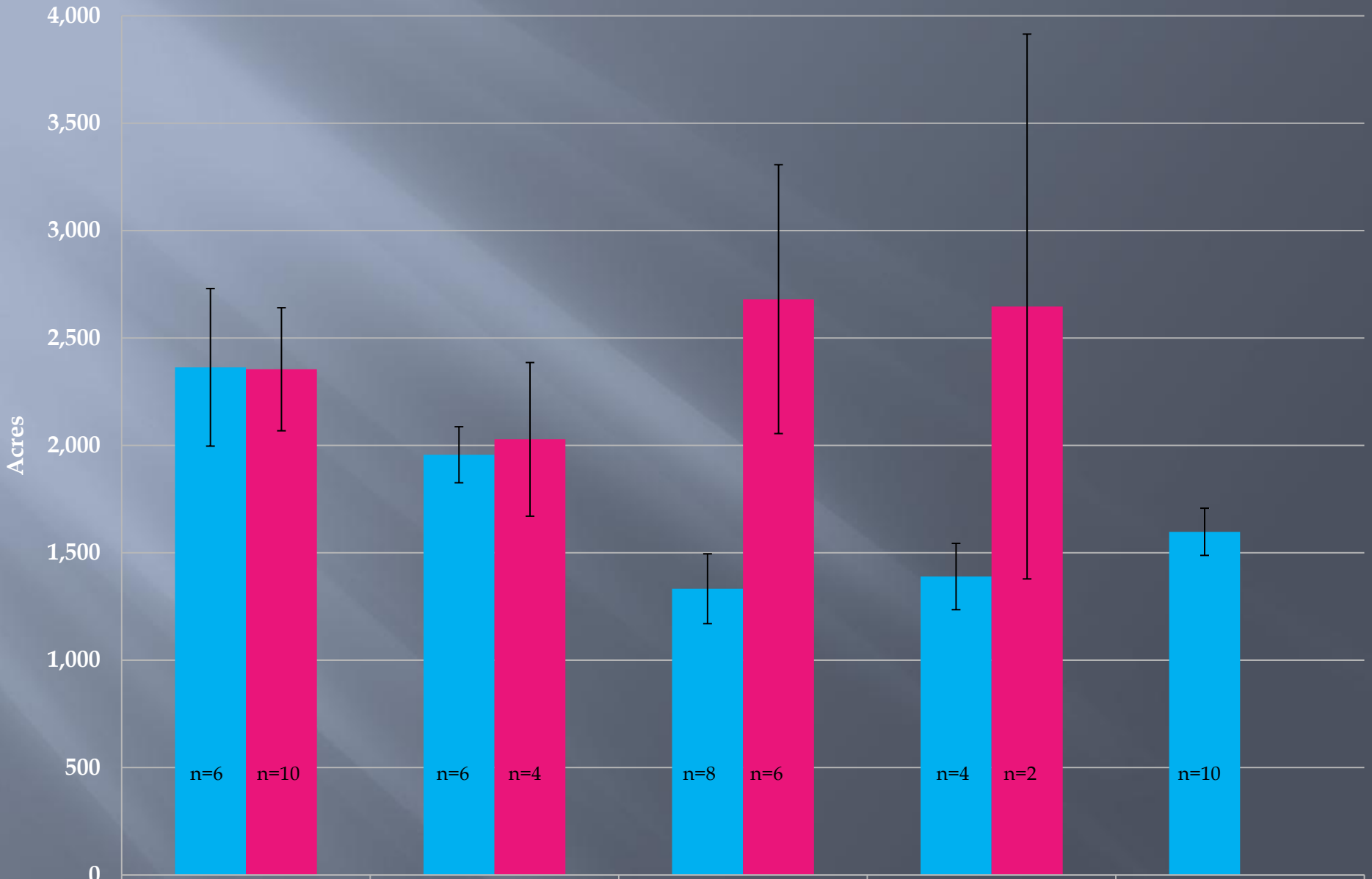

J 1 2009 Seasonal Home Ranges
N
W
E
S
Legend
J 1
PERCENT
50 (3,941 ac)
95 (22,775 ac)
100 (66,085 ac)
Winter
Fall
Summer
Spring
0 0.5 1 2 3 4 5 6
Miles

Core Areas

- Where each deer spends approximately 50% of his time
- Based on the density of known locations



Apache vs Jobe Annual Core Area (50% Kernel)



	2006	2007	2008	2009	2010
Apache	2,363	1,956	1,332	1,389	1,597
Jobe	2,354	2,028	2,681	2,646	

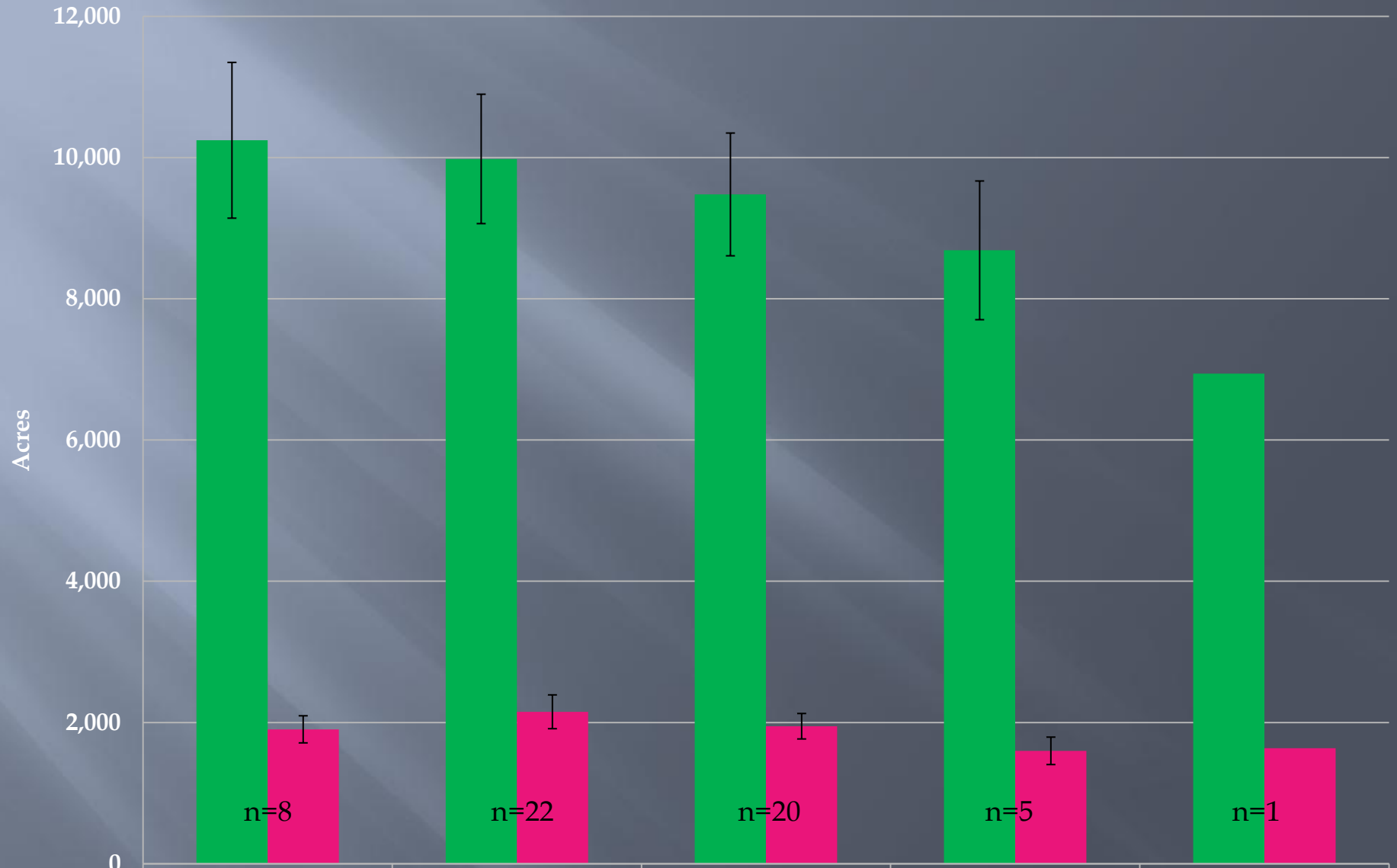
Apache vs. Jobe Average Seasonal Core Area Size From 2006-2010 (50% Kernel)

	Spring	Summer	Fall	Winter	Annual
Apache	1487	1330	1139	1727	1709
Jobe	1752	1665	1451	2244	2410

Home Ranges

- How do home ranges change as deer grow older?

Annual Home Ranges Of Mature Mule Deer Based On Age From 2006-2010

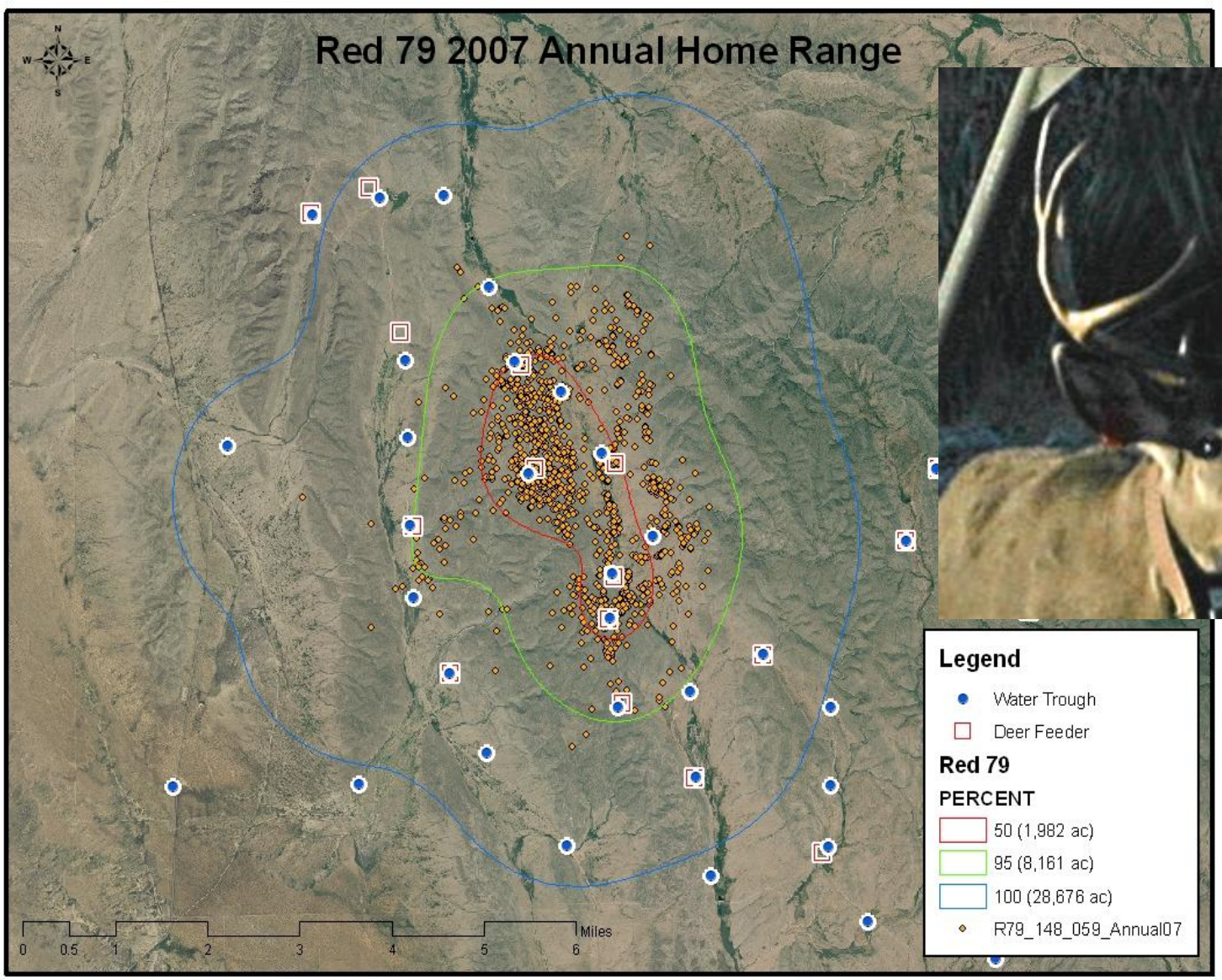


	4 yrs	5 yrs	6 yrs	7 yrs	8 yrs
95% Kernel	10,244	9,980	9,477	8,686	6,939
50% Kernel	1,903	2,152	1,947	1,599	1,634

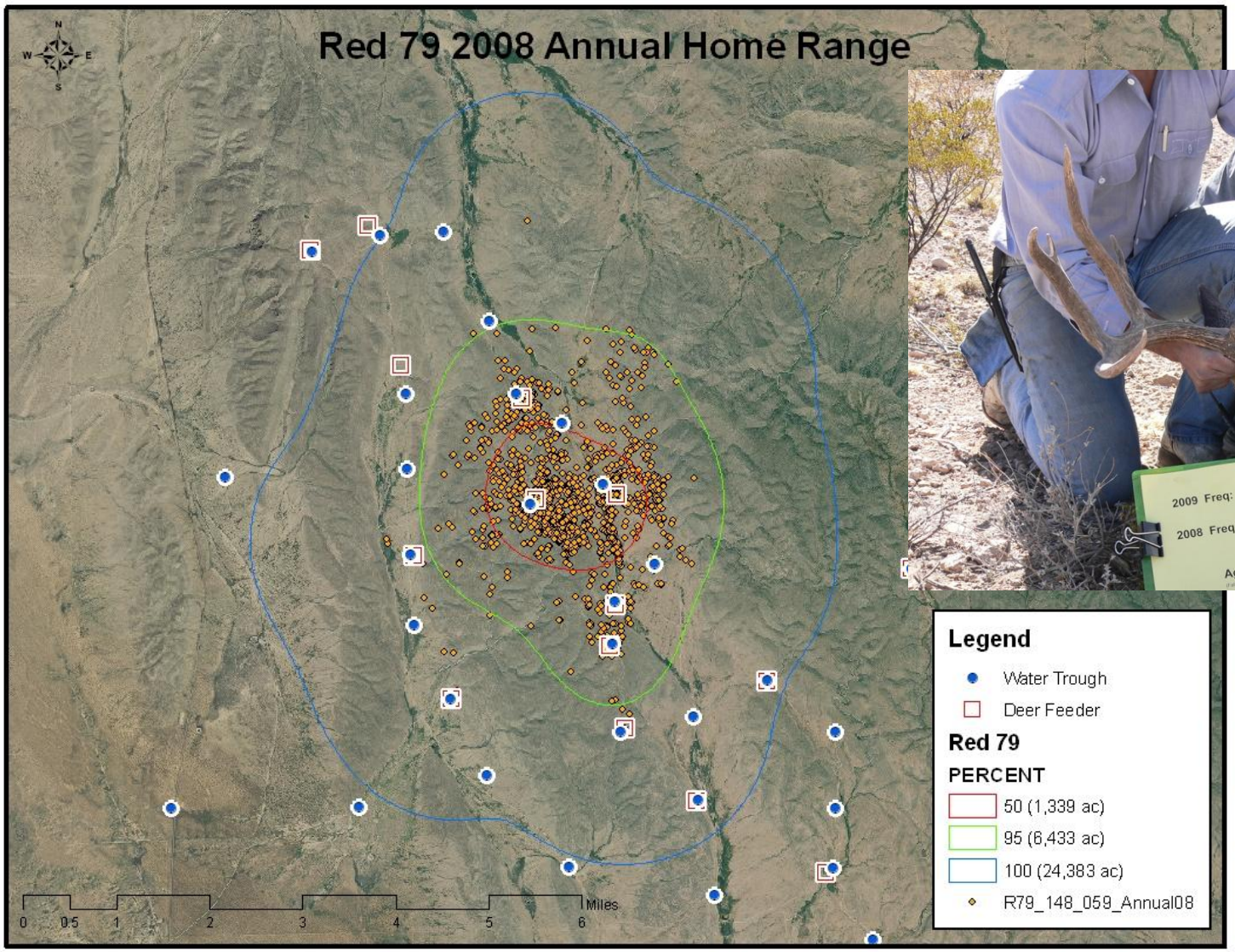
Seasonal Home Ranges Of Mature Mule Deer Based On Age

	Spring	Summer	Fall	Winter
4 yrs	7,891	6,271	5,367	13,577
5 yrs	7,721	6,566	5,864	8,646
6 yrs	6,755	6,345	5,626	8,868
7 yrs	6,216	5,917	4,688	8,067
8 yrs	7,157	5,746	5,071	5,049

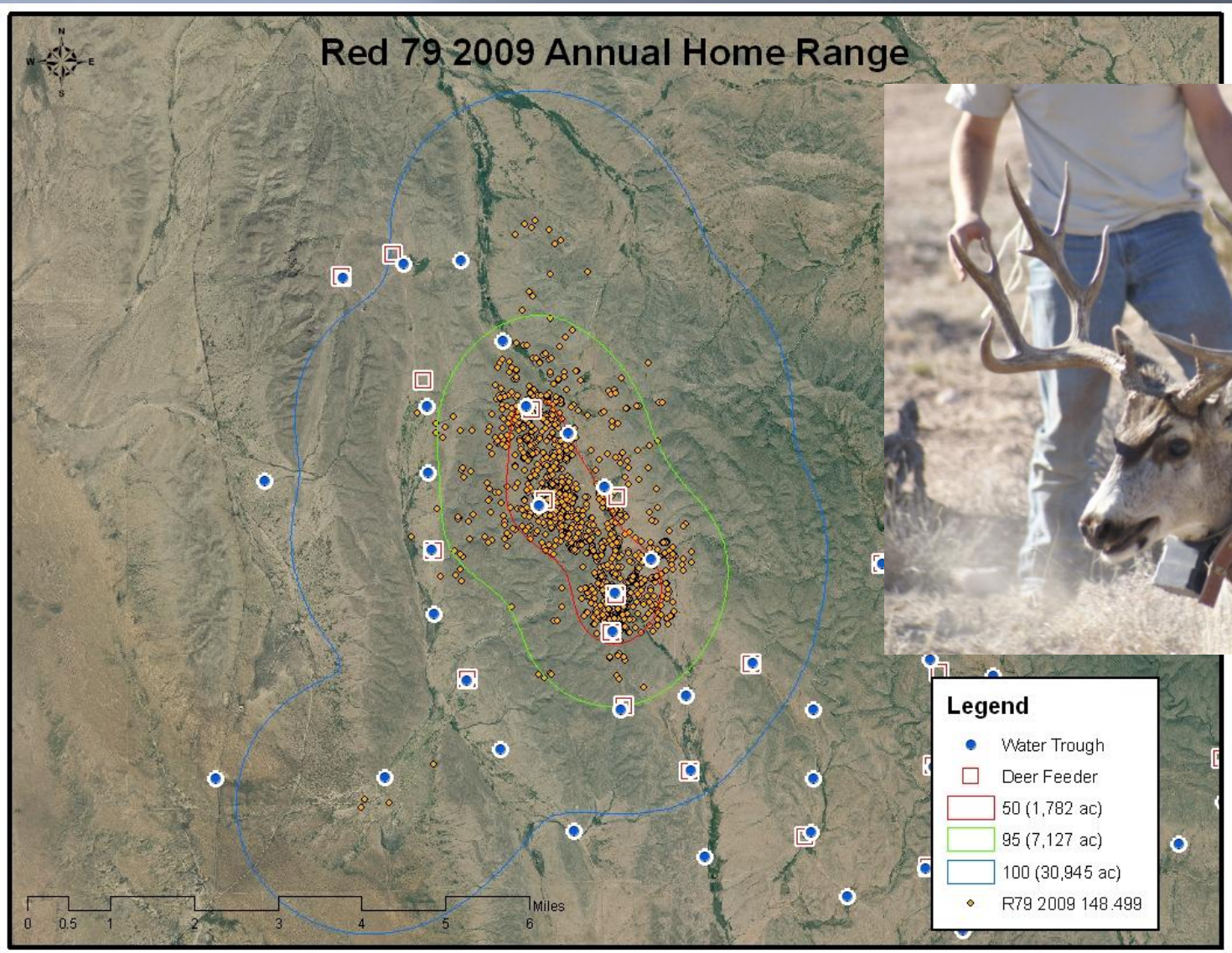
Annual Home Ranges



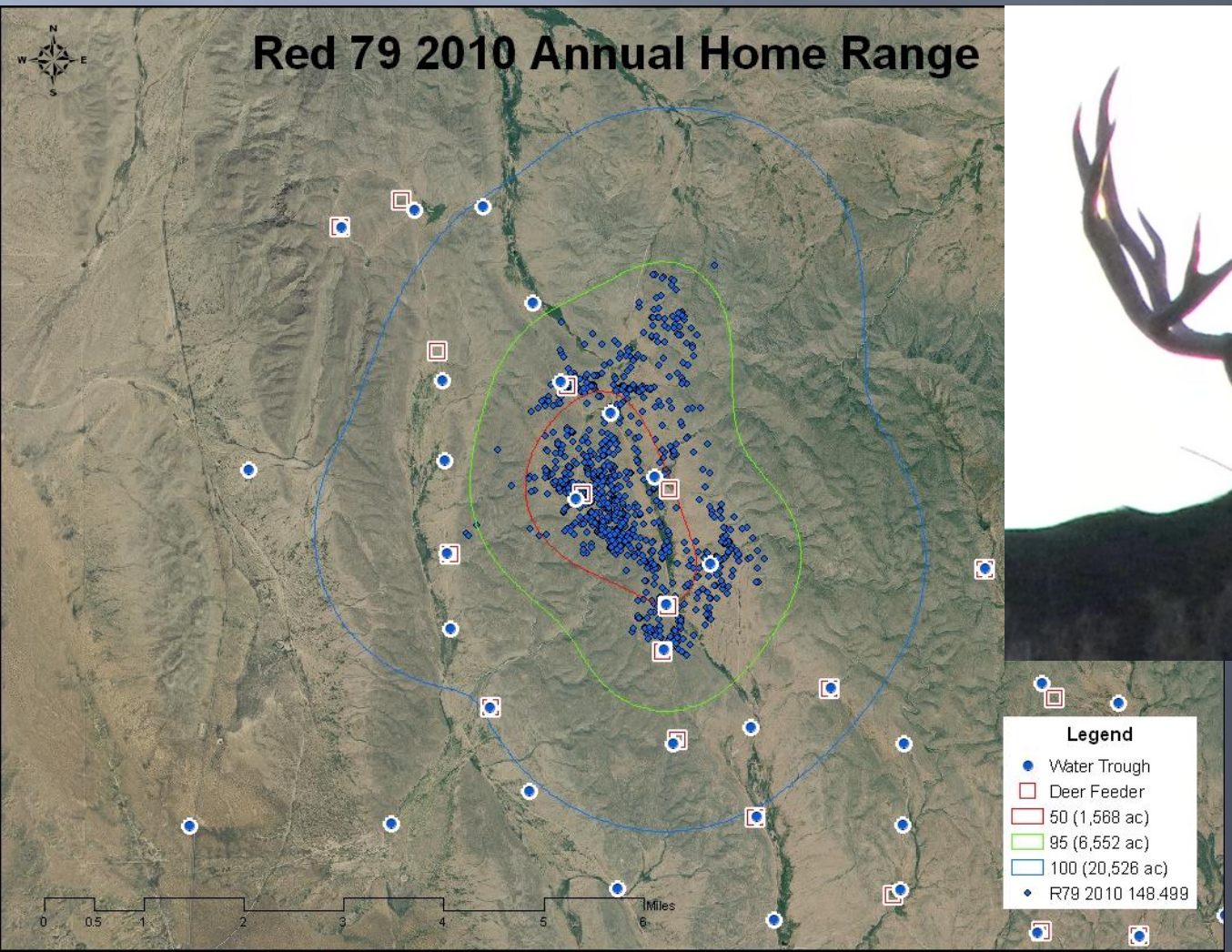
Annual Home Ranges

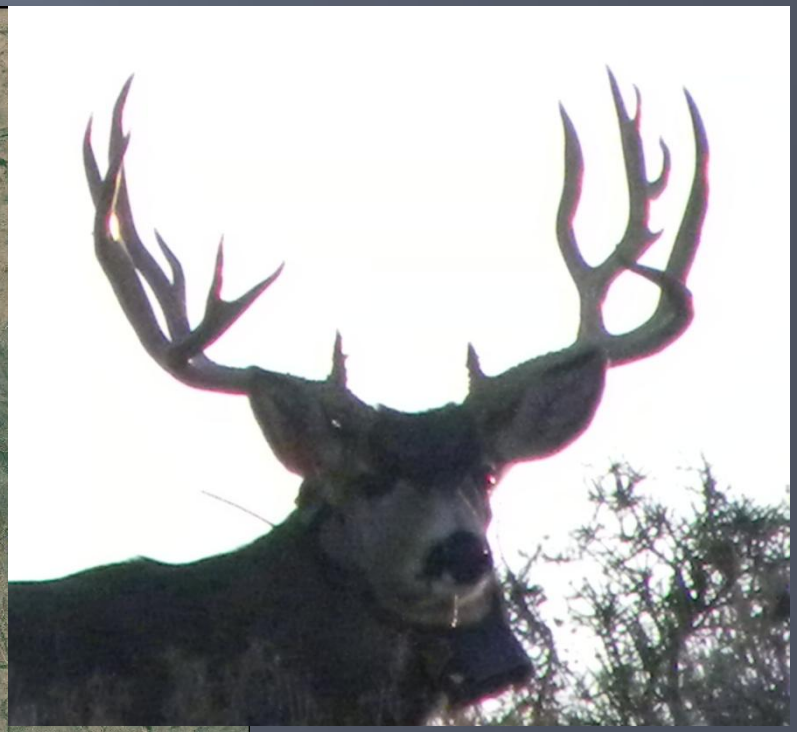


Annual Home Ranges

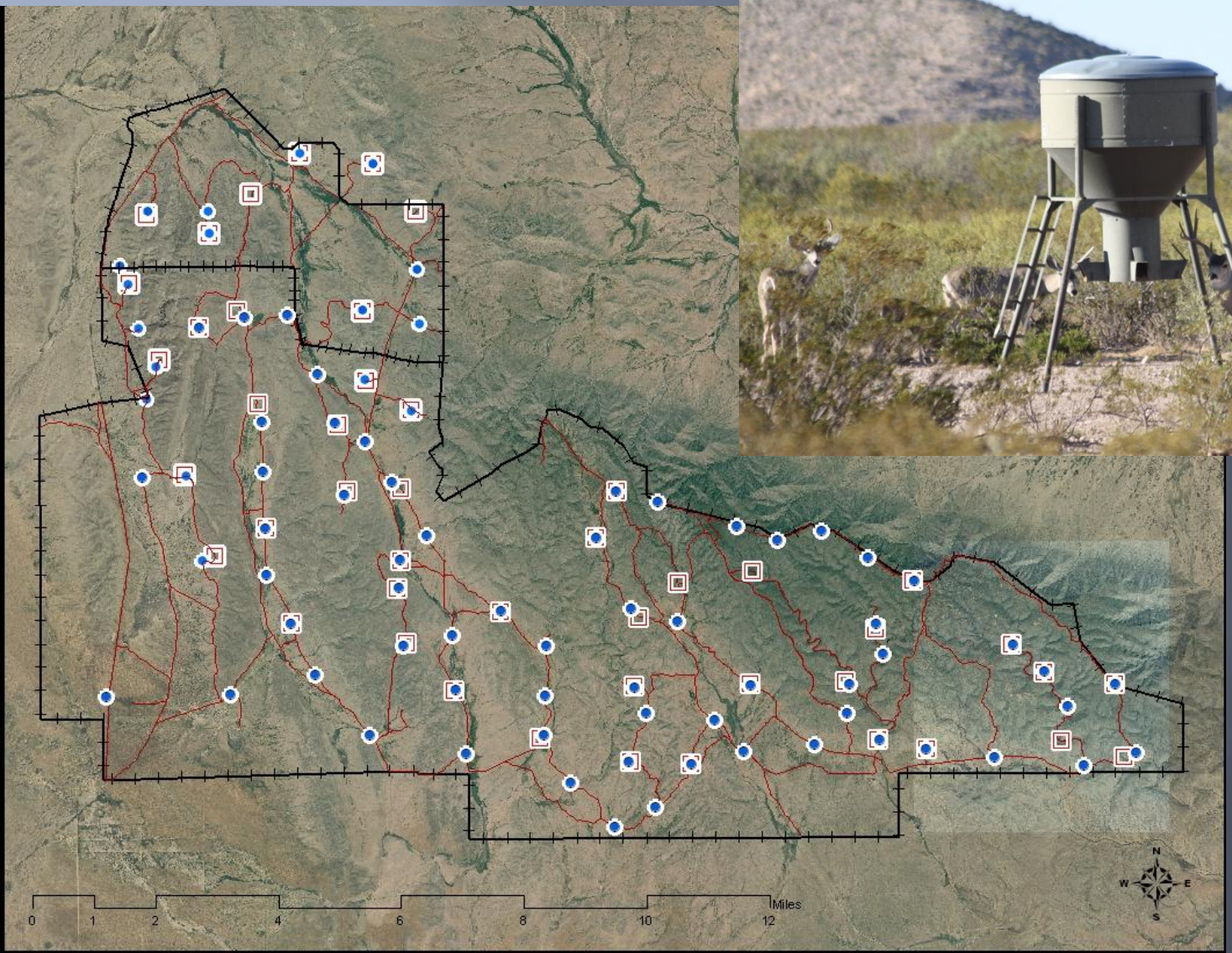


Annual Home Ranges



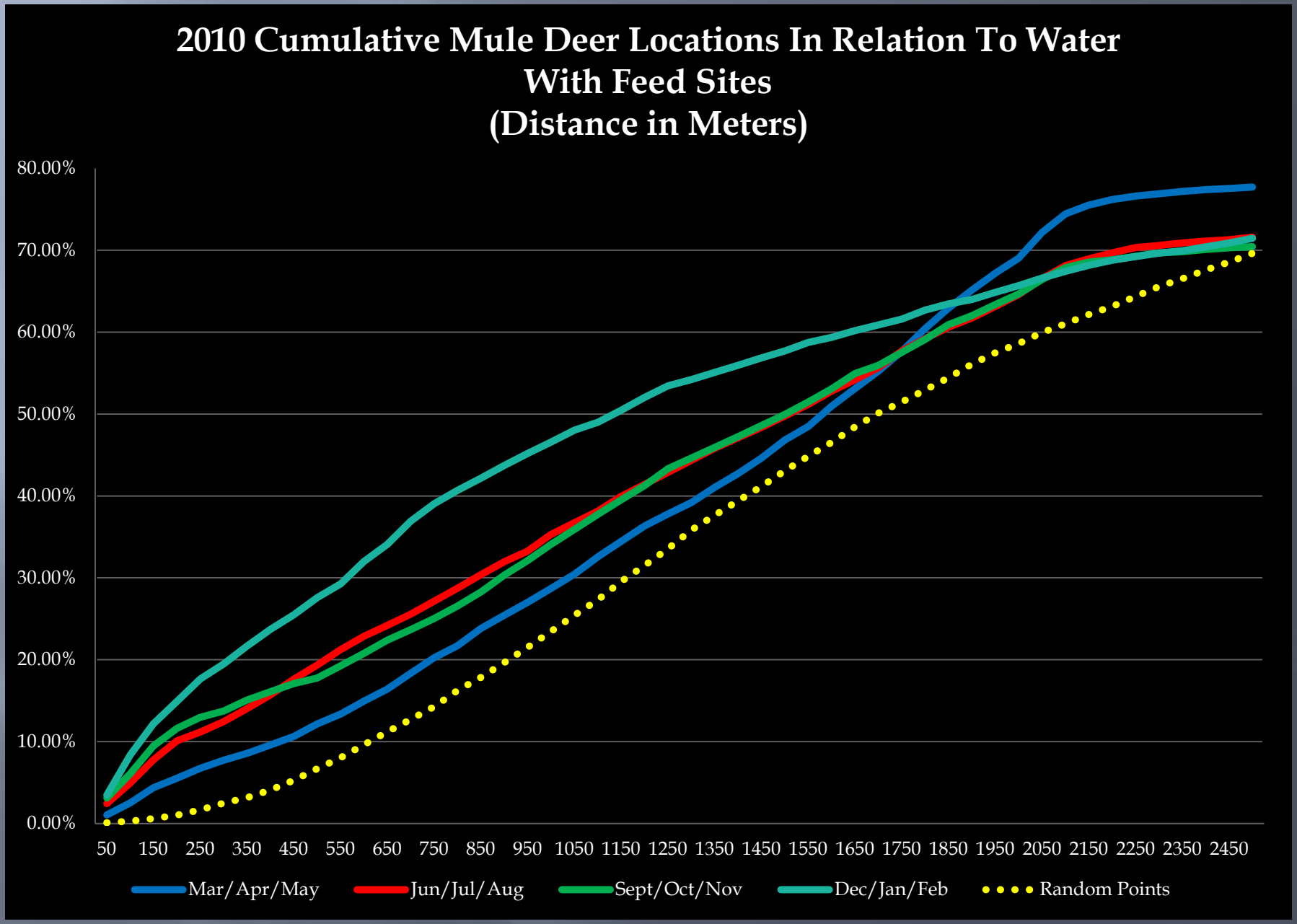


Effects Of Supplemental Feed & Water



Effects Of Supplemental Feed & Water

2010 Cumulative Mule Deer Locations In Relation To Water With Feed Sites (Distance in Meters)

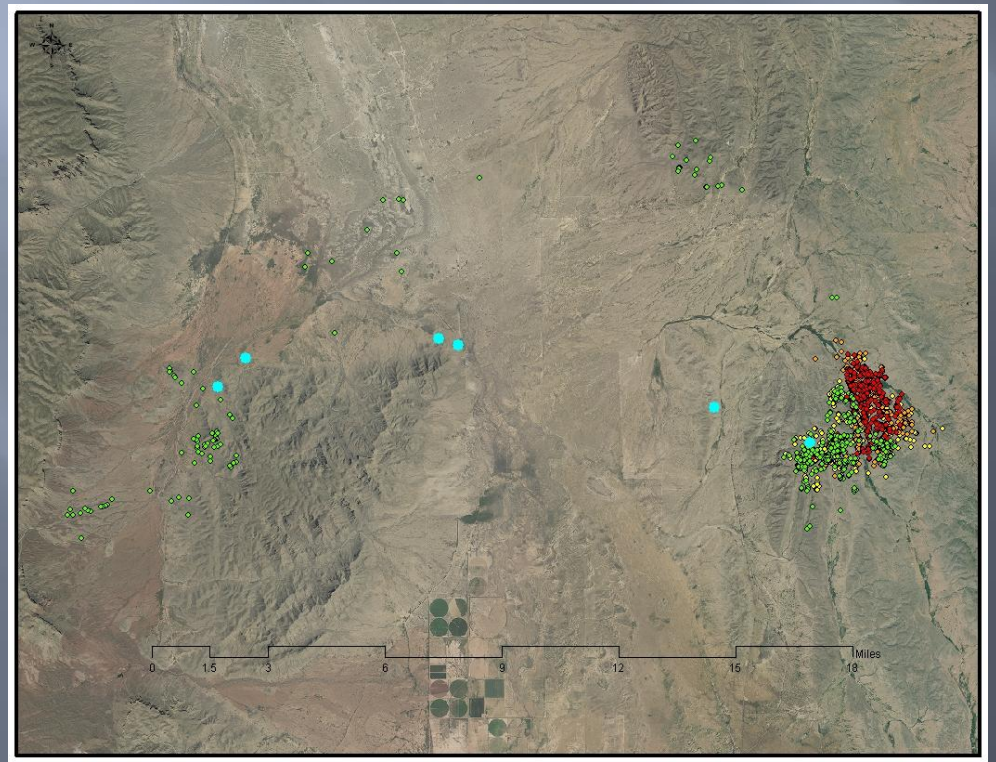


Future Studies

- Habitat Use (Ecological Sites, Slope, Aspect)
- Influence of Ag production
- Effects of supplemental feed on immigration, emigration, nutrition, & fawn recruitment
- Movements & dispersal of 1.5 yr – 3.5 yr old deer
- Fawn survival & recruitment
- Home ranges on female mule deer
- Breeding efficiency of mule deer bucks (paternity/genetics) & antler development of bucks (10 yr study across multiple ranches)

Future Studies

- Daily Movements
- 15.9 Miles Over 25 Hours
- 6.8 Miles Over 5 hours



Management Implications

- Management of Mule deer may have to take place on much larger scale than previously thought
- Supplemental feeders may increase fawn crops and deer densities

Conclusion

- Seasonal home ranges vary
  - Largest home range during the winter
  - Smallest home range during the fall
- Habitat selectivity may be affected by supplemental feed and water
- Deer appear to spend a significant amount of time near feed and water locations

Acknowledgements

- Apache Ranch
  - Dan Allen & Peggy Hughes
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- Dallas Safari Club
- John Poindexter
- Chris Moser
- San Antonio Livestock Show
- Steve C. Lewis
- Circle Ranch
- Dr. Bill Eikenhorst
- DF Ranch
- Brad Everett
- Nelson Puett Foundation
- Hill Country Safari Club

Questions