DNA-based Diet Identification of Mountain Lions in Southwestern Arizona

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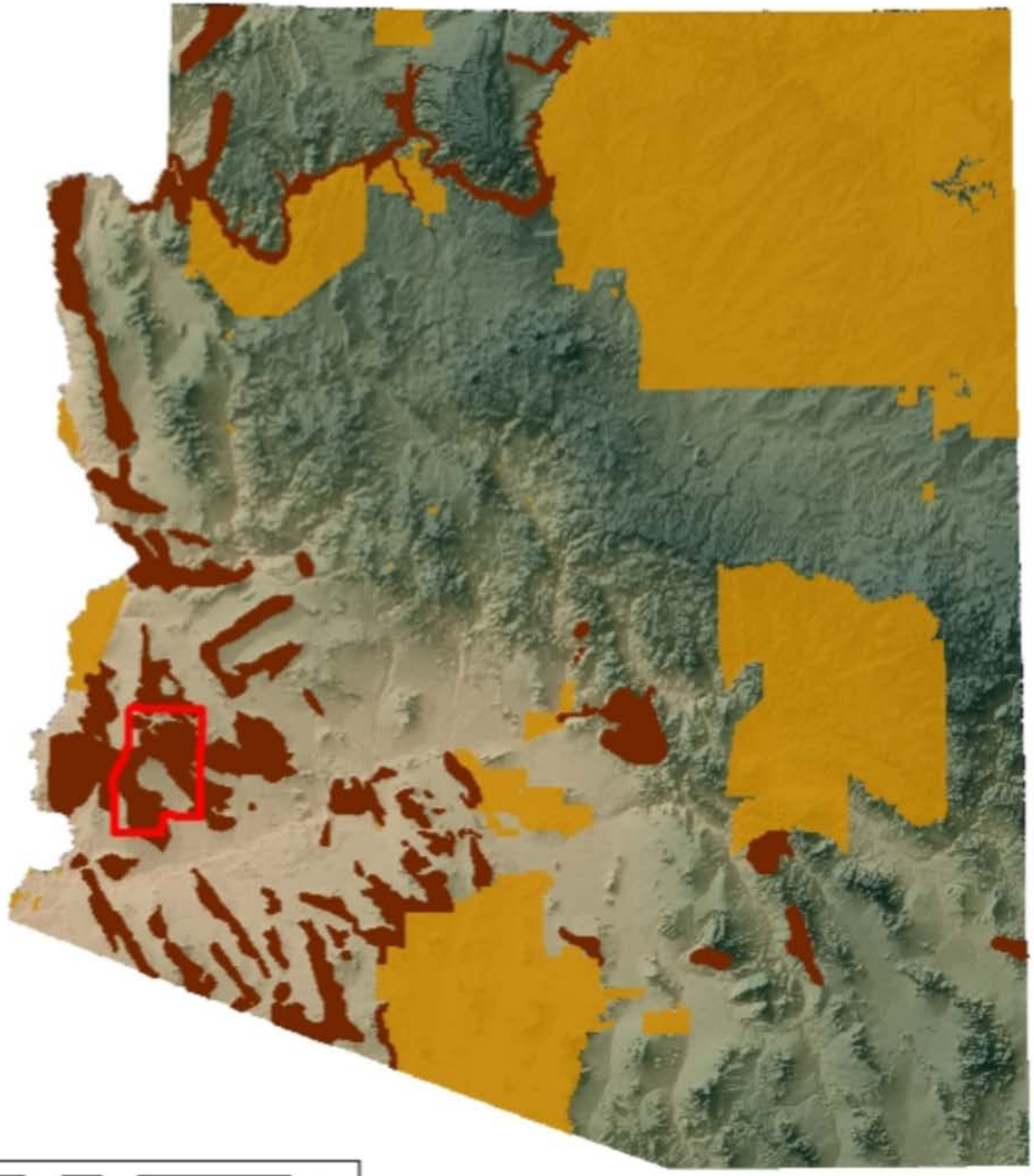
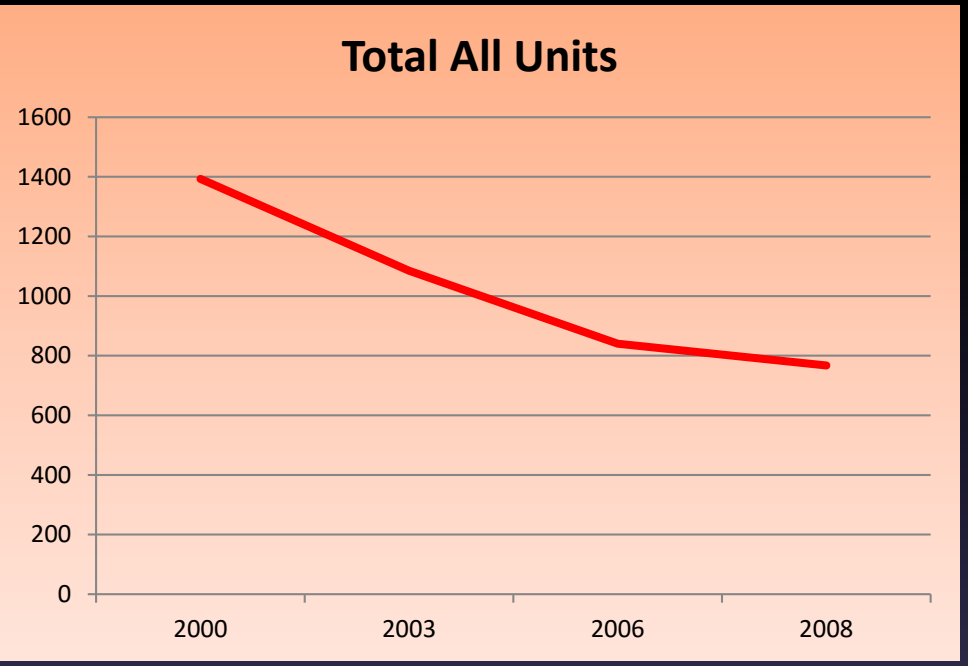
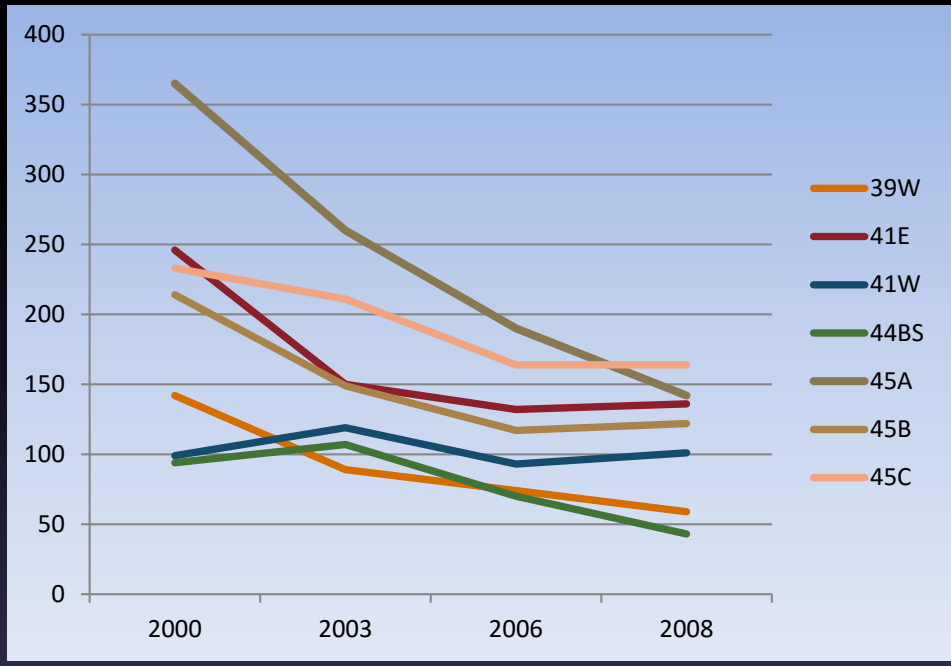
OVERVIEW

- Concern and Need for Mountain Lion Diet Study
- Using Genetic Analyses to Identify Diet
- Current Results: DNA-based Mountain Lion Diet
- Management Implications of Findings

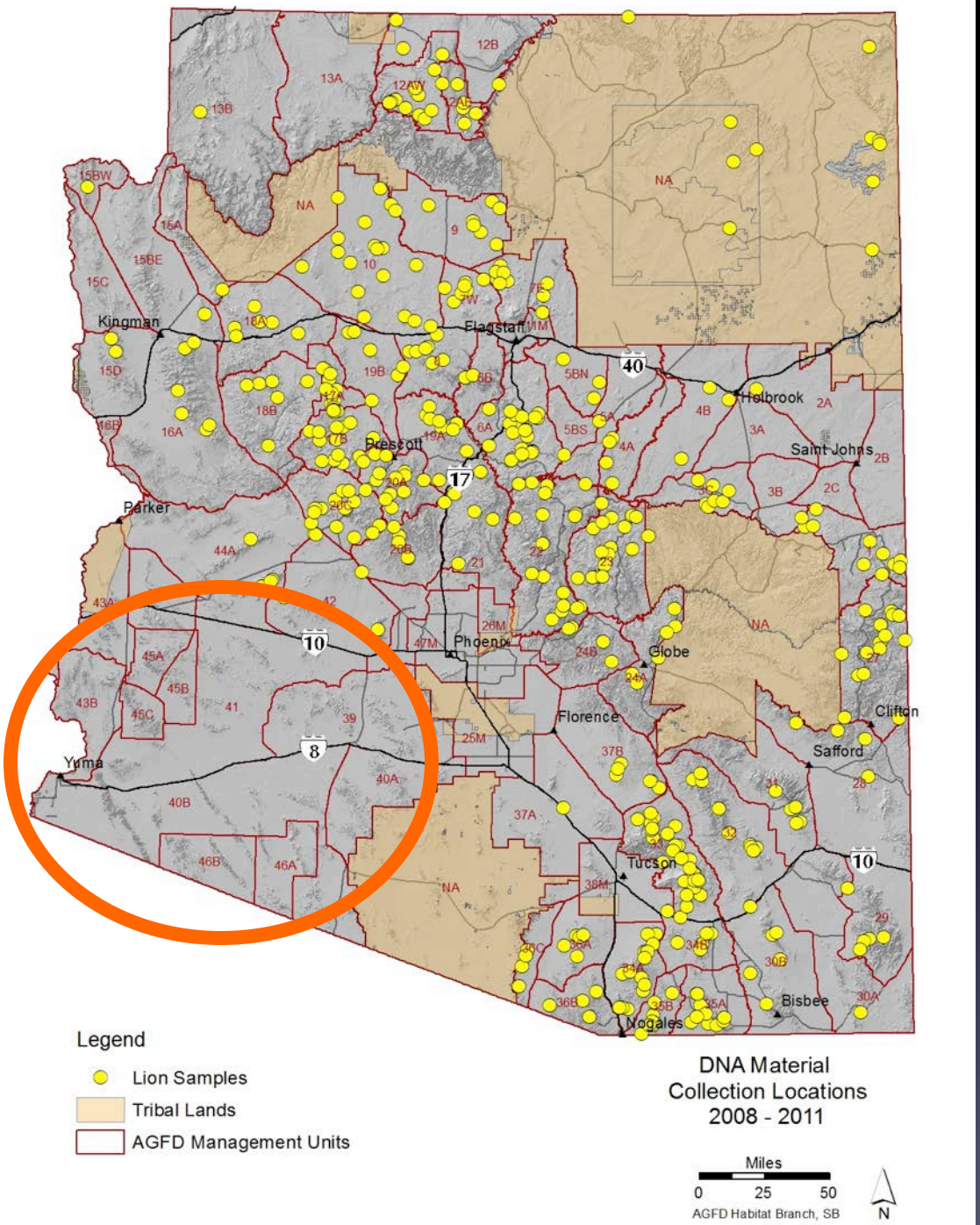

0
25
50
100
Miles
Legend
Bighorn Sheep
Tribal Lands

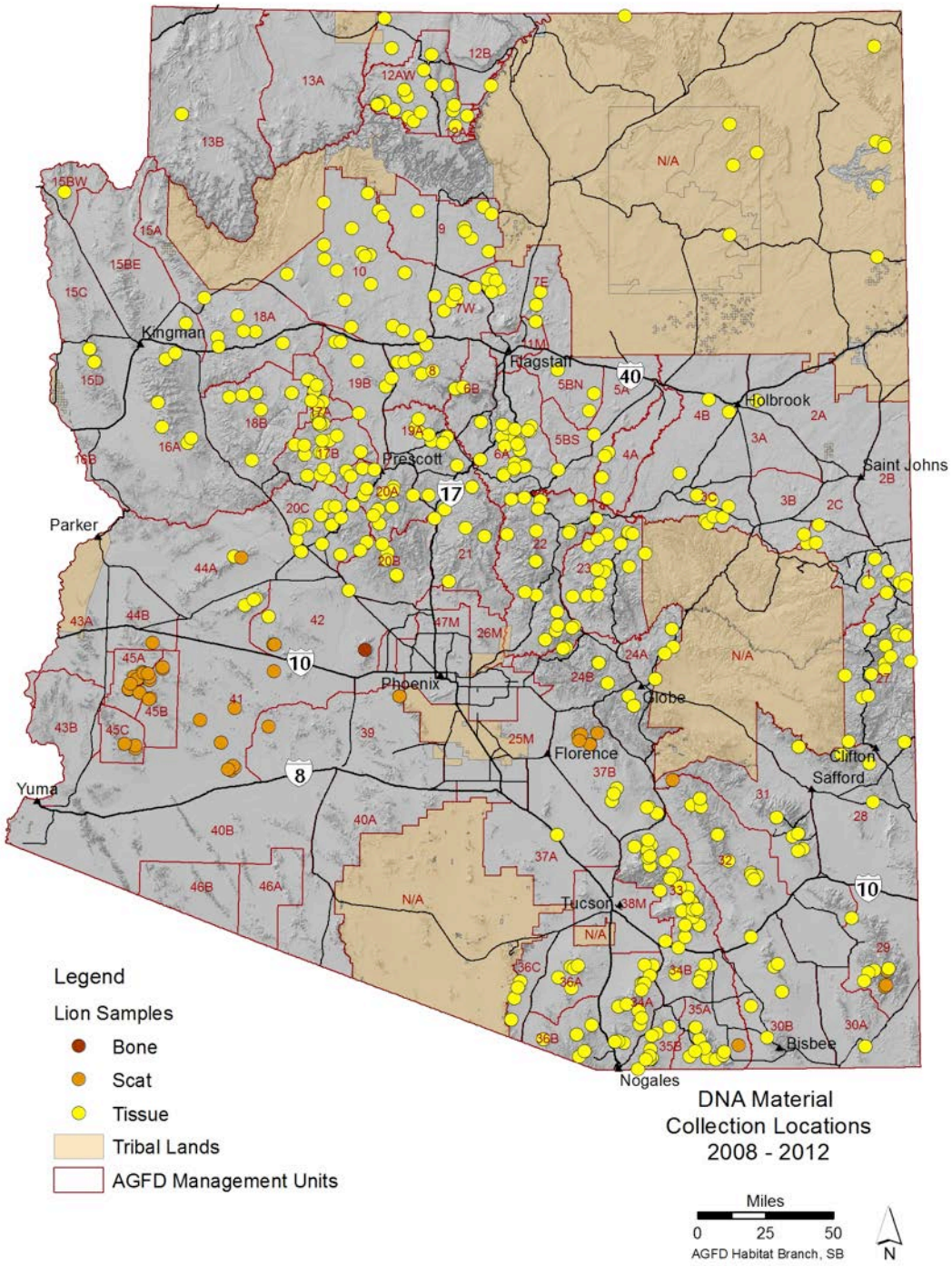
Sheep population trends: 2000 - 2008





- 49% decline from 2000 to 2008
- Total number declined, Kofa units are the core of this population and account for a large part of the decline
- But there has been a decline across all these units since 2000


Kingman
Flagstaff
Holbrook
Saint Johns
Prescott
Parker
Phoenix
Globe
Clifton
Florence
Safford
Yuma
Tucson
Bisbee
Nogales
40
17
10
8
NA
Legend
Lion Samples
Tribal Lands
AGFD Management Units
DNA Material
Collection Locations
2008 - 2011
Miles
0
25
50
AGFD Habitat Branch, SB
N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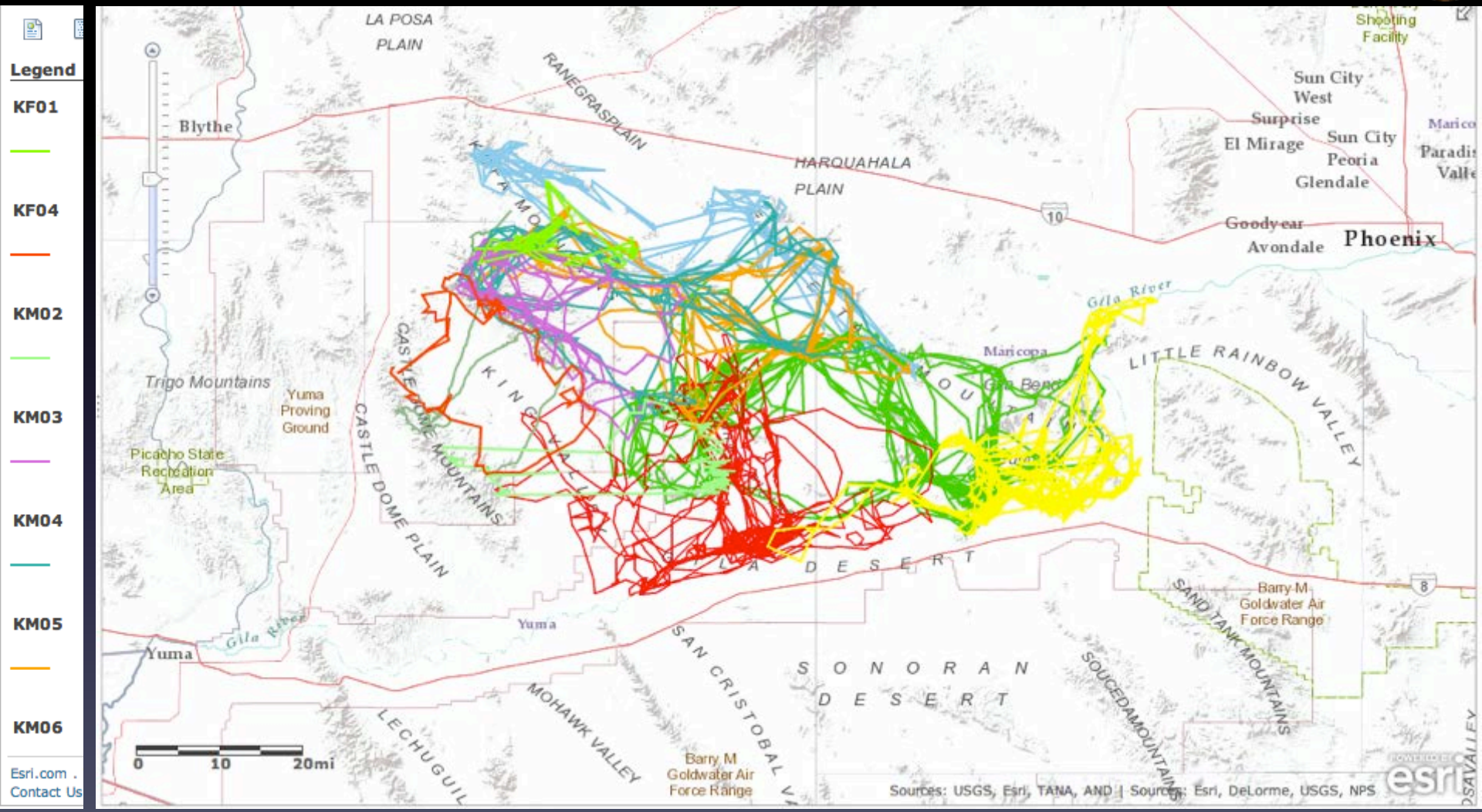
GPS-Collar Data from 10 Mountain Lions in SW AZ, 2006–2012

Henry *et al.* (AGFD, USFWS)



Morphological Diet Analyses

Cunningham *et al.* (1999)

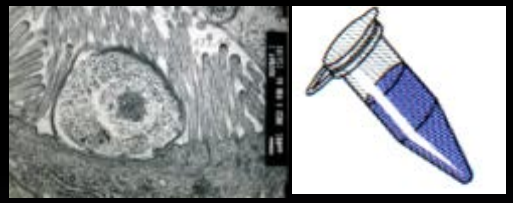
Mountain lion prey selection in southeastern AZ

- Morphological ID of Predator Scats
- Morphological ID of Prey Remains

DNA-based diet studies	DNA-based Prey Species ID
Farrell *et al.* (2000) – Predator Species ID	×
Fedriani & Kohn (2001) – Predator Individual ID	×
Krausman *et al.* (2006) – Predator Species ID	×


a-DNA LAB
QIAGEN

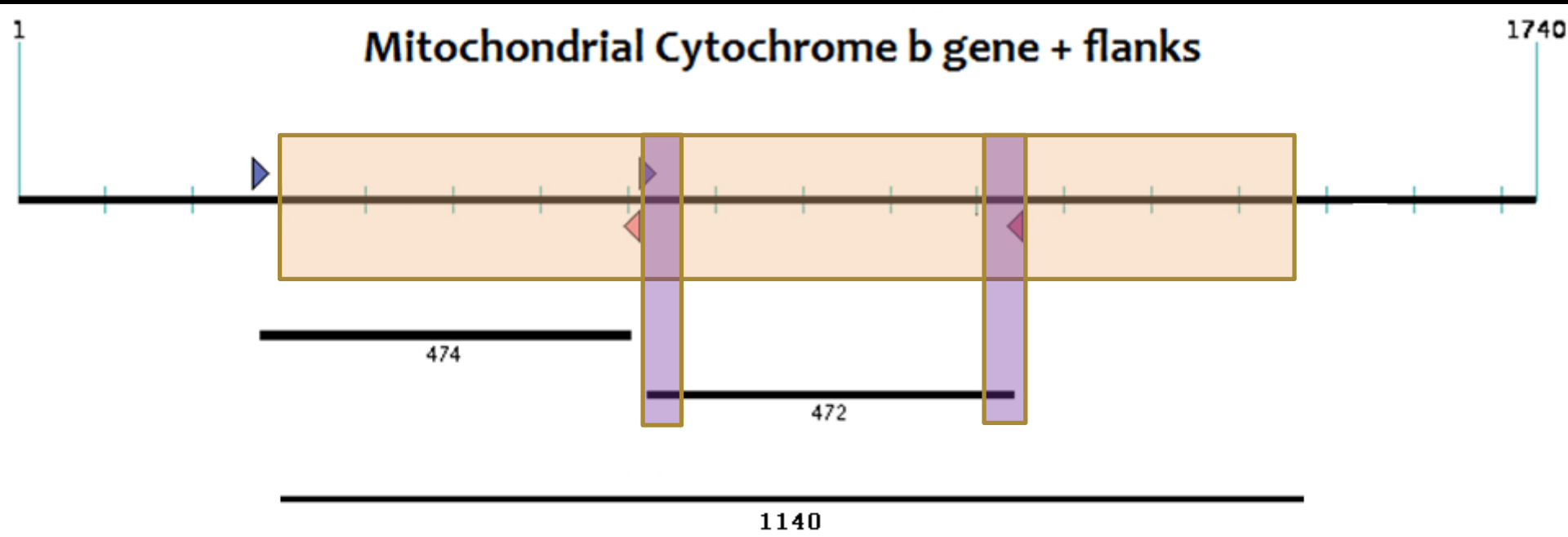
Methodology

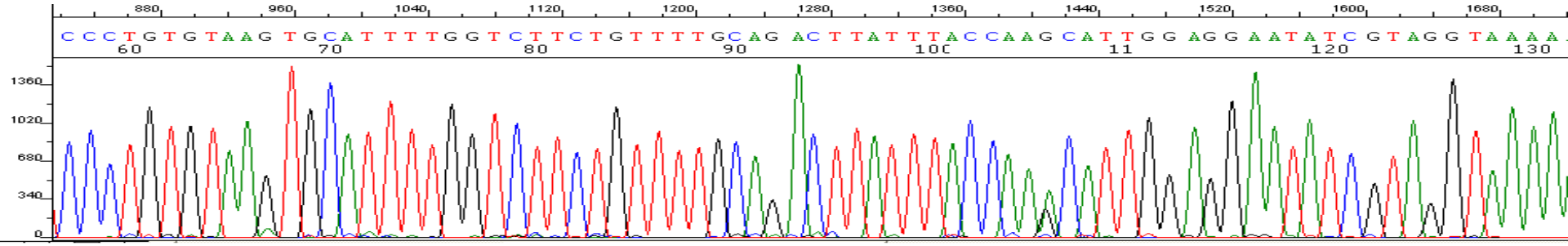


DNA
extraction

PCR Amplification

472 bp fragment of
Cytochrome b gene





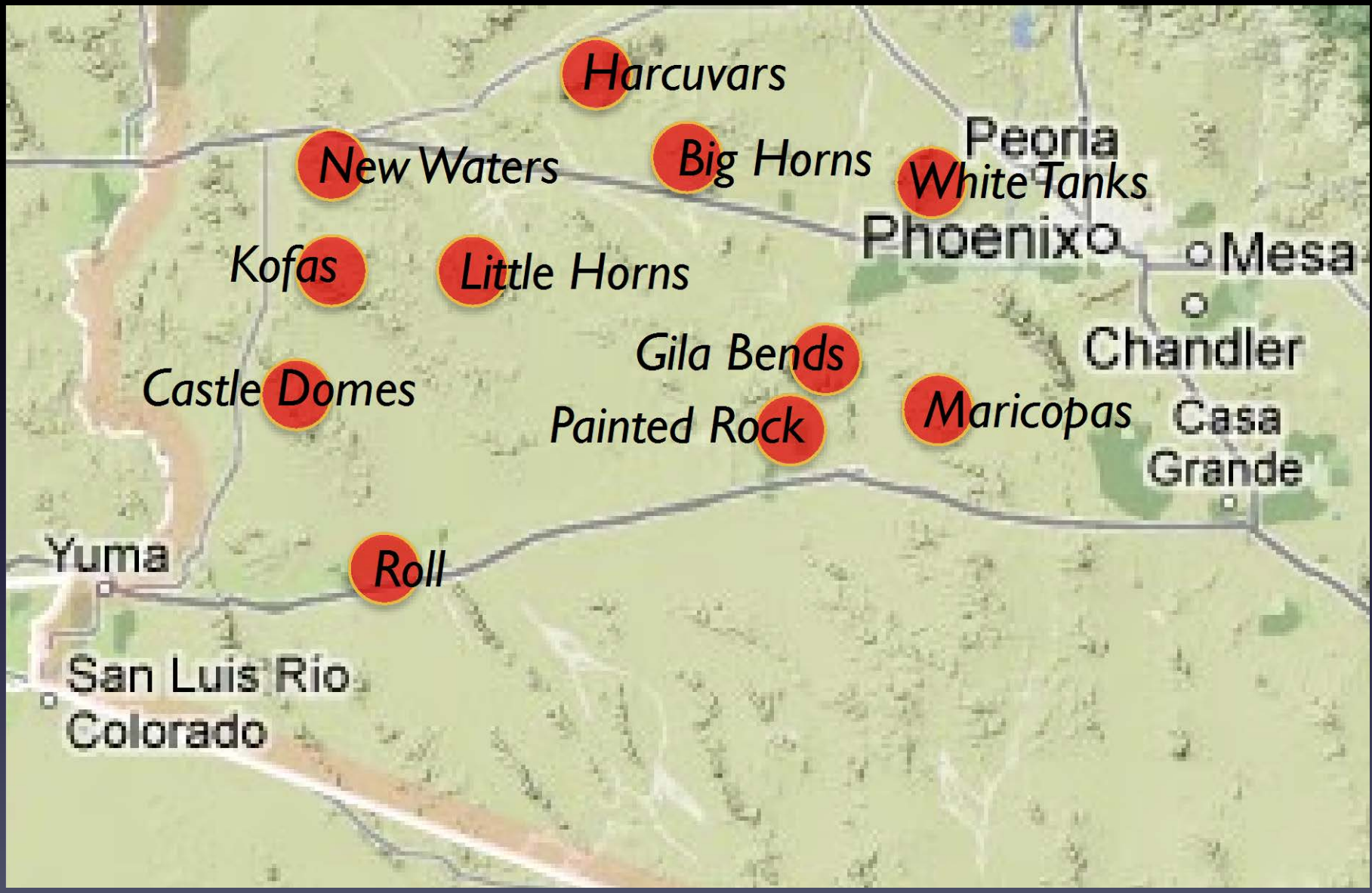
Sequences producing significant alignments:

Accession	Description	Max score	Total score	Query coverage	E value	Max ident
AY598487.1	Puma concolor cytochrome b (CYTB) gene, complete cds; mitochondrial	841	841	100%	0.0	98%
EF689048.1	Lynx pardinus isolate MHN1 cytochrome b (cytb) gene, complete cds; mitochondrial	573	573	99%	3e-160	88%
EF689047.1	Lynx pardinus isolate C28 cytochrome b (cytb) gene, complete cds; mitochondrial	573	573	99%	3e-160	88%
FJ594957.1	Catopuma temminckii cytochrome b (cytb) gene, complete cds; mitochondrial	553	553	100%	4e-154	87%
AB210233.1	Prionailurus bengalensis mitochondrial cytb gene for cytochrome b, complete cds, haplo	542	542	99%	8e-151	87%
FJ160761.1	Felis silvestris cytochrome b gene, partial cds; mitochondrial	540	540	99%	3e-150	87%

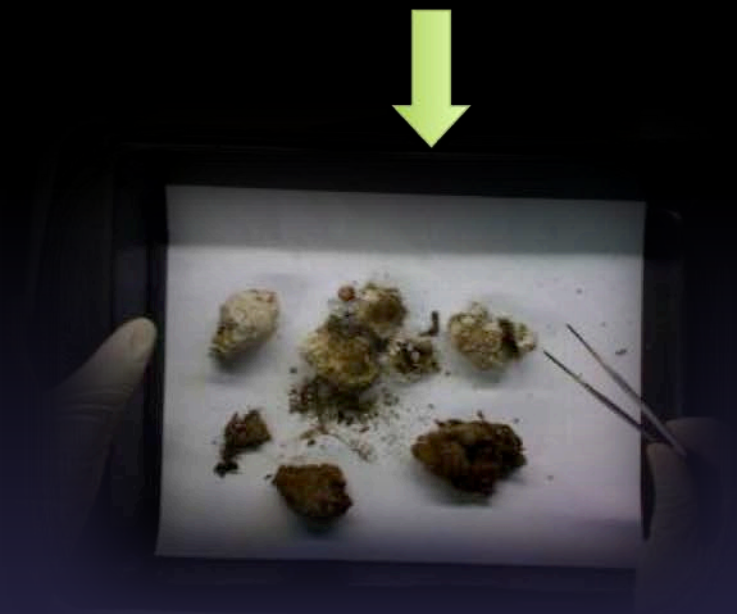
SCAT ANALYSIS SUCCESS

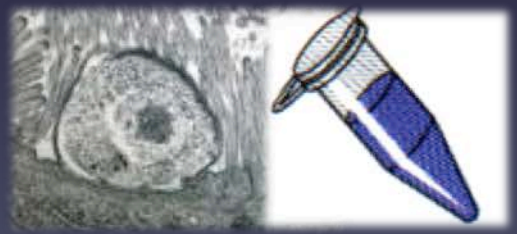
Scat Sample Analysis	Number of Samples	Success Rate in Species ID
Collected	152	
Successful PCR Amplification and Confirmed Species ID from DNA Sequences	Puma: 77 Coyote: 14 Bobcat: 2 Kit fox: 1	50.7 % (*Puma concolor*) 62 % (All species)
Failed PCR Amplification and/or unconfirmed Species ID from Sequences	58	

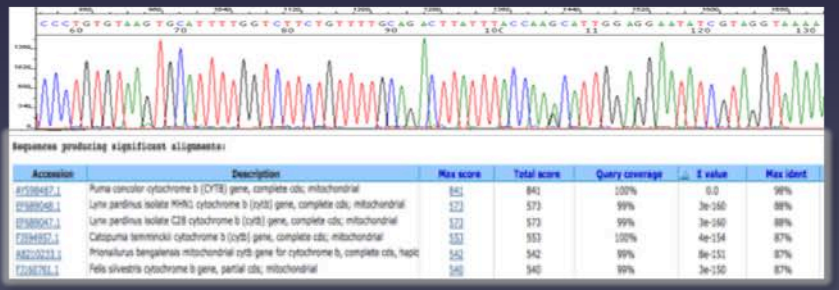
CONFIRMED MOUNTAIN LION SCAT LOCATIONS



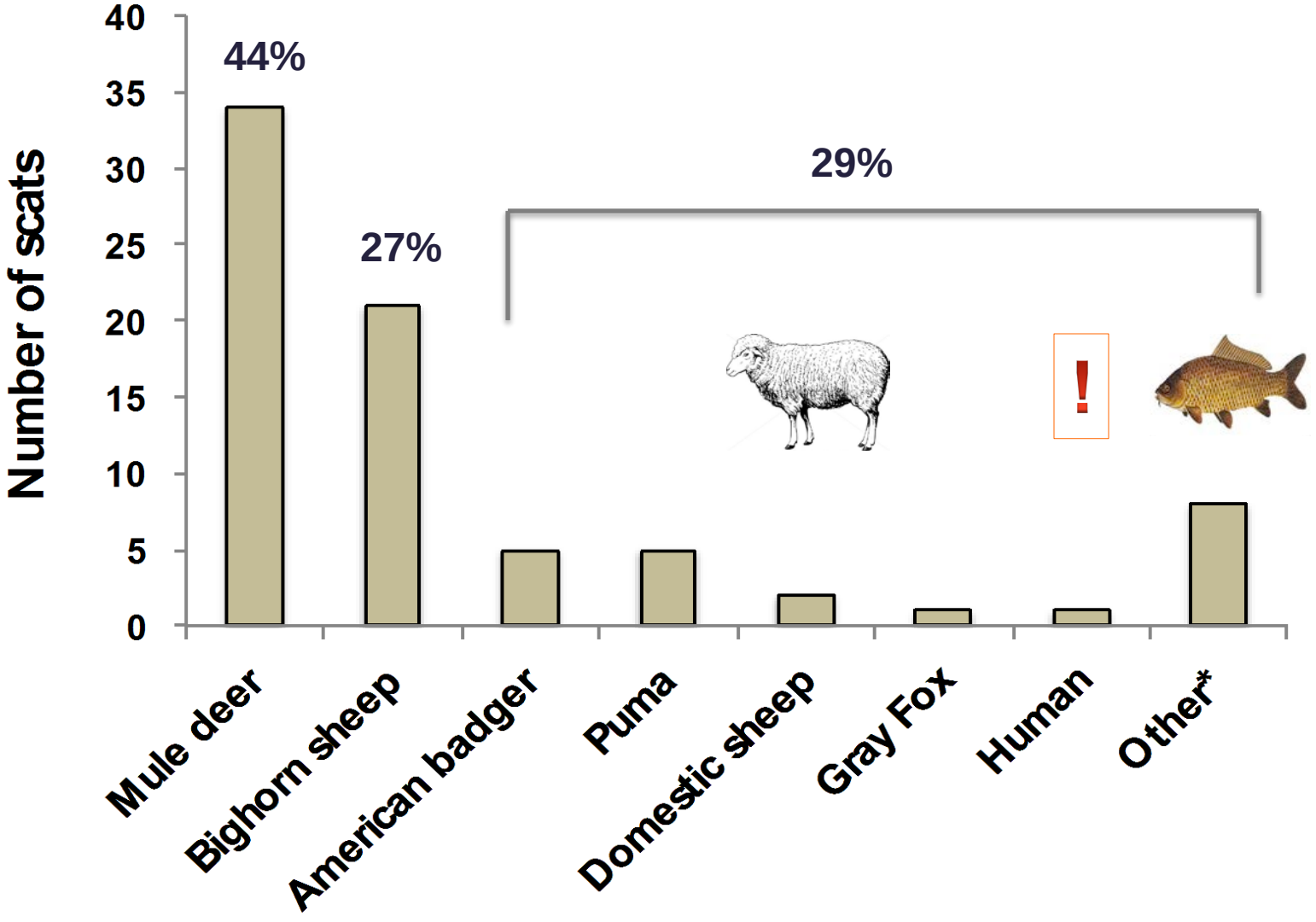
Prey Species Identification

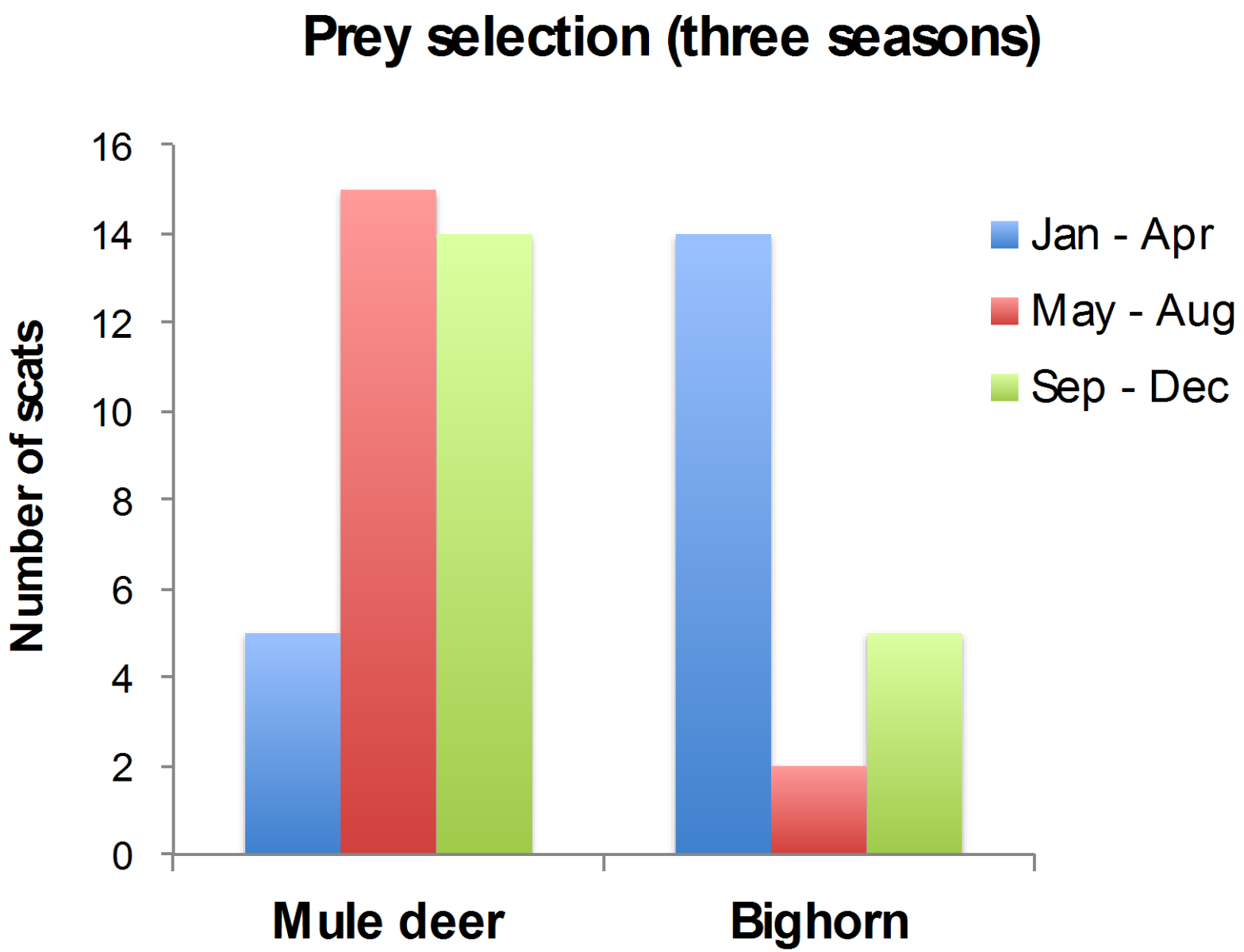






Diet composition of mountain lions in SW AZ




Prey selection (three seasons)
Number of scats
16
14
12
10
8
6
4
2
0
Jan - Apr
May - Aug
Sep - Dec
Mule deer
Bighorn

Management Implications

- Conditioned Taste Aversion (CTA)
- "Sparky" – The Electric Sheep
- Predation Management Plans (e.g. Kofa NWR)
- Photo recognition technology at water developments
- Capture – spay/neuter – Release
- Translocation (Revisited using GPS collars)

Thank You

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Desert Bighorn Council

Wild Felid Research & Management Association

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