

Genetic Assessment of Mountain Lions in SW Arizona



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OVERVIEW

A brief history of mountain lions

Current concern – bighorn sheep decline

Investigating mountain lions on Kofa
NWR

Current study objectives in SW AZ + P.O.A.

Why the rivers? + How you can help...

Major historical radiations

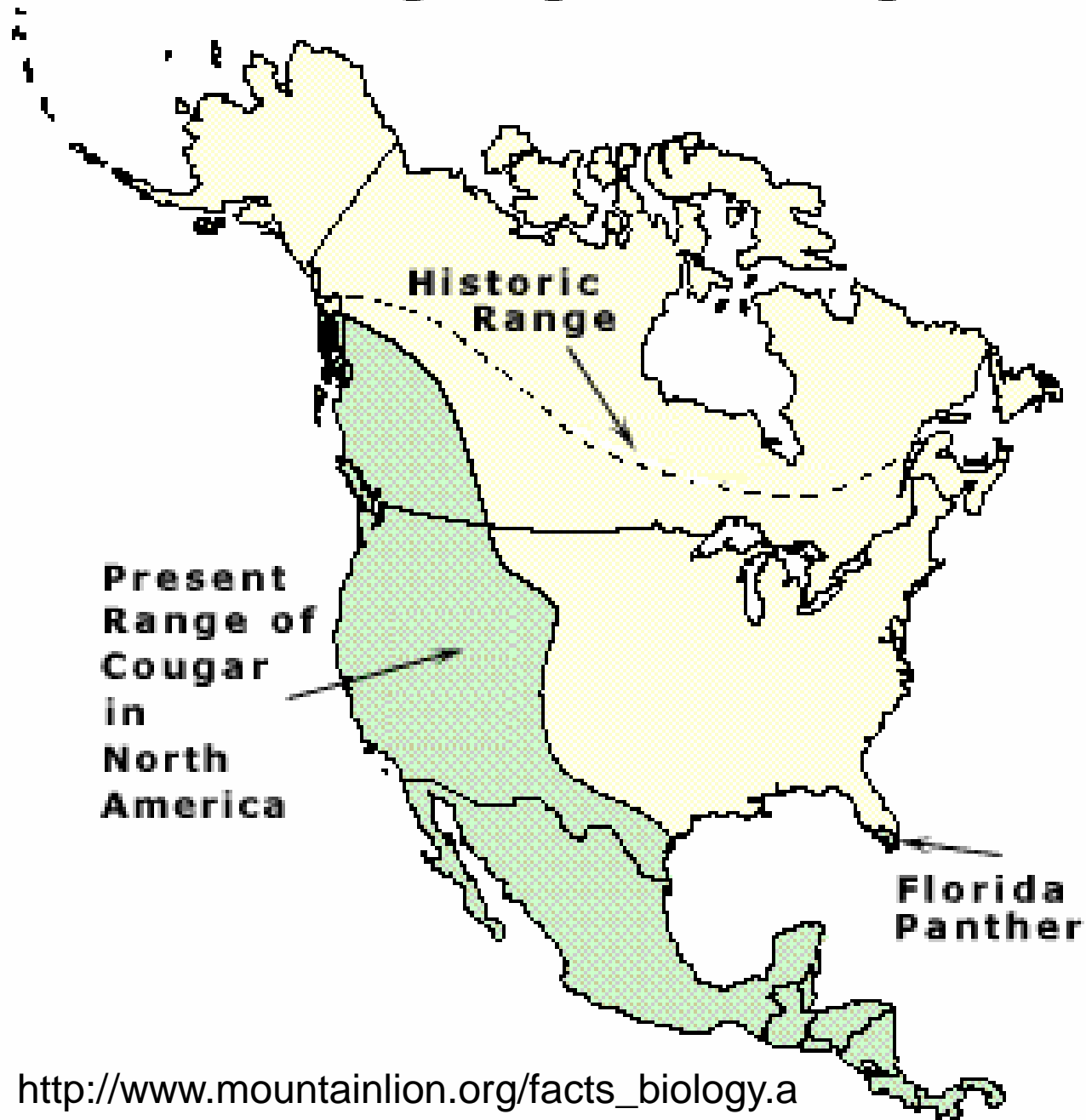
- One locally distributed
- One broad ranging



Culver et al. 2000



Shrinking Range of the Cougar



http://www.mountainlion.org/facts_biology.a

sp

Major restrictions
to gene flow:

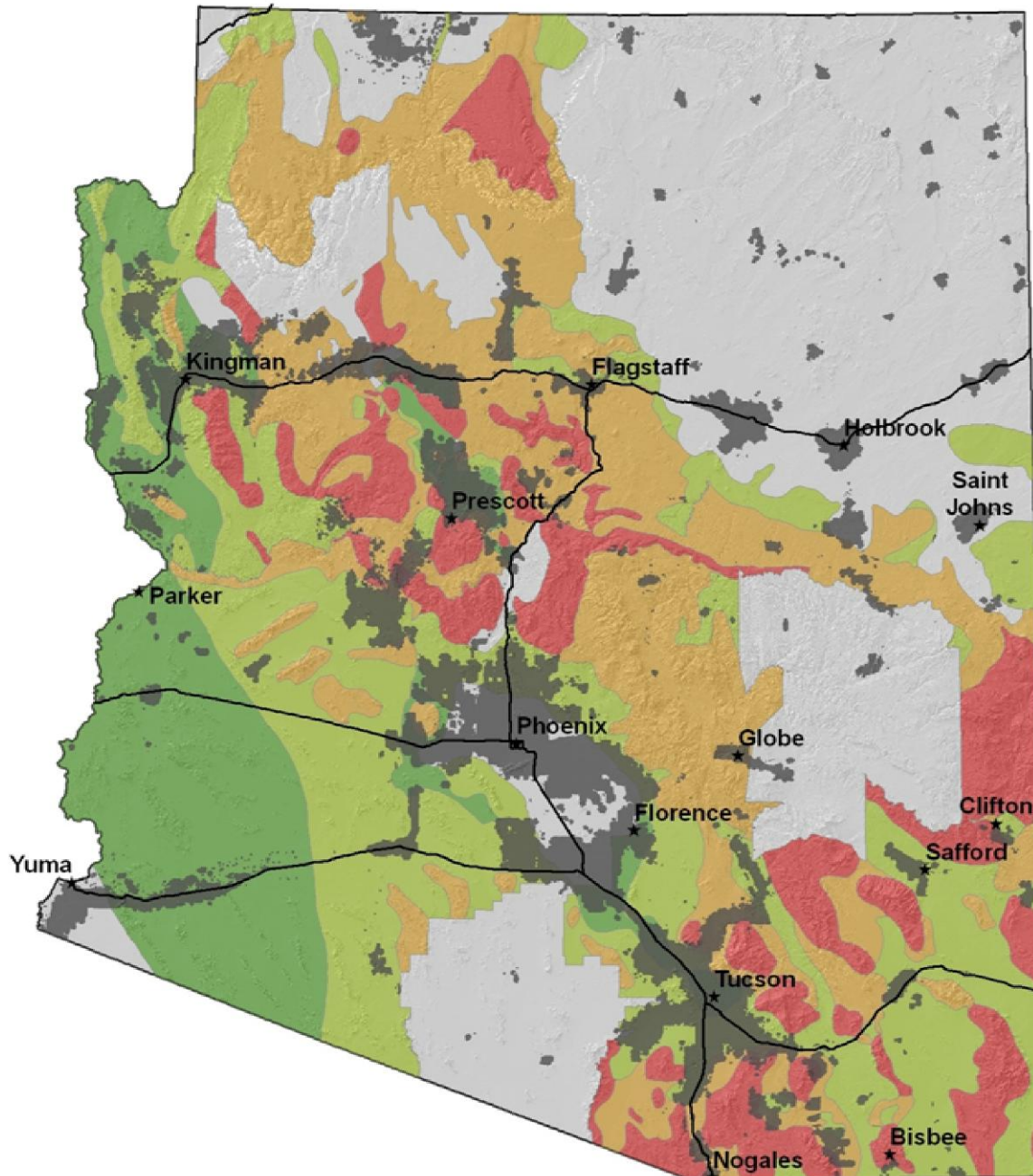
6 distinct
sub-species

Puma concolor
couguar

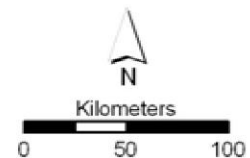


Culver et al. 2000

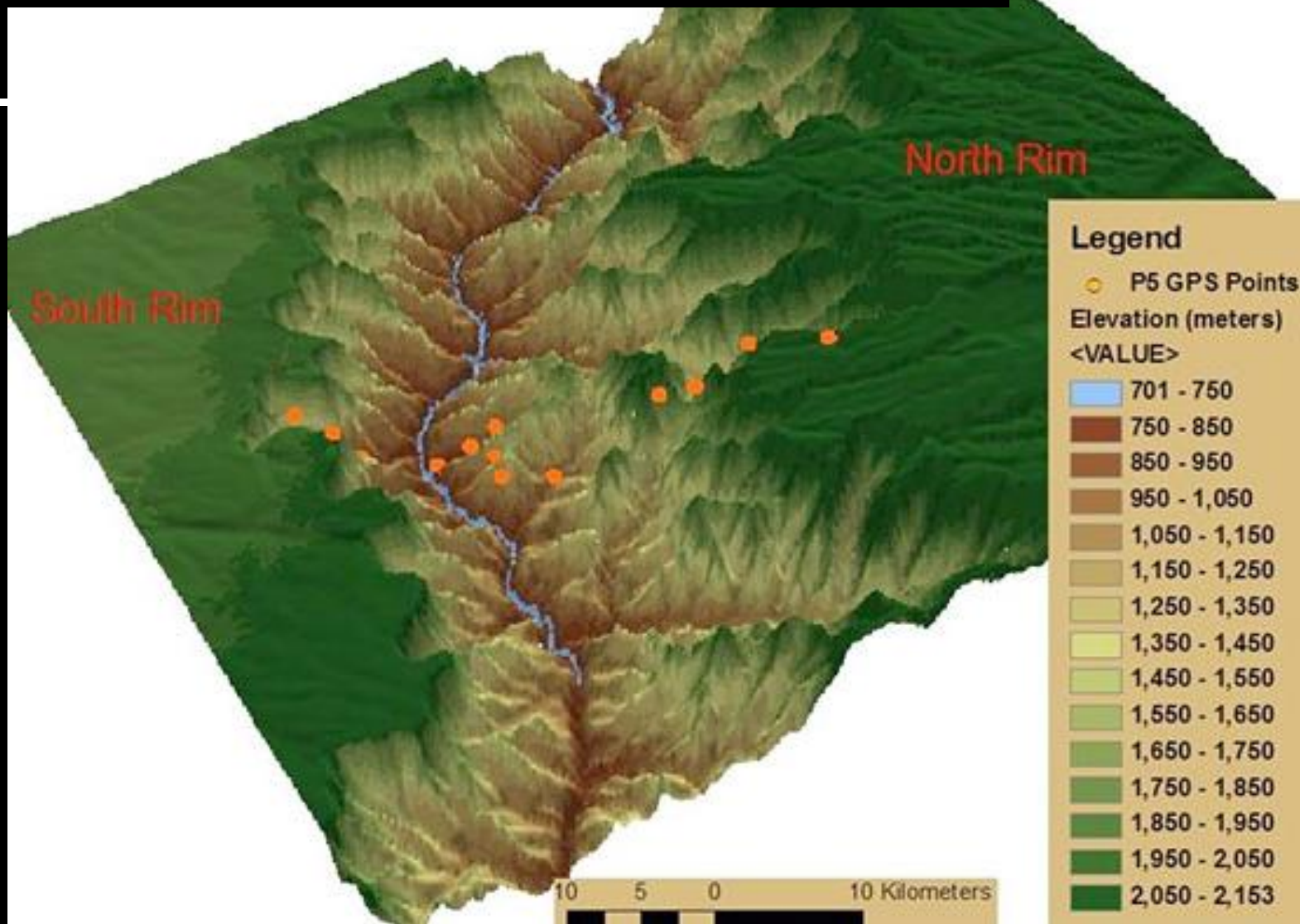
Mountain Lion Distribution with Urban Growth for 2050



- Urban Growth 2050
- High (0.05-0.10 lions per sq. mile)
- Medium (0.01-0.05 lions per sq. mile)
- Low (0.005-0.01 lions per sq. mile)
- Sparse (0-0.005 lions per sq. mile)

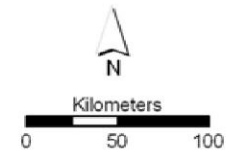
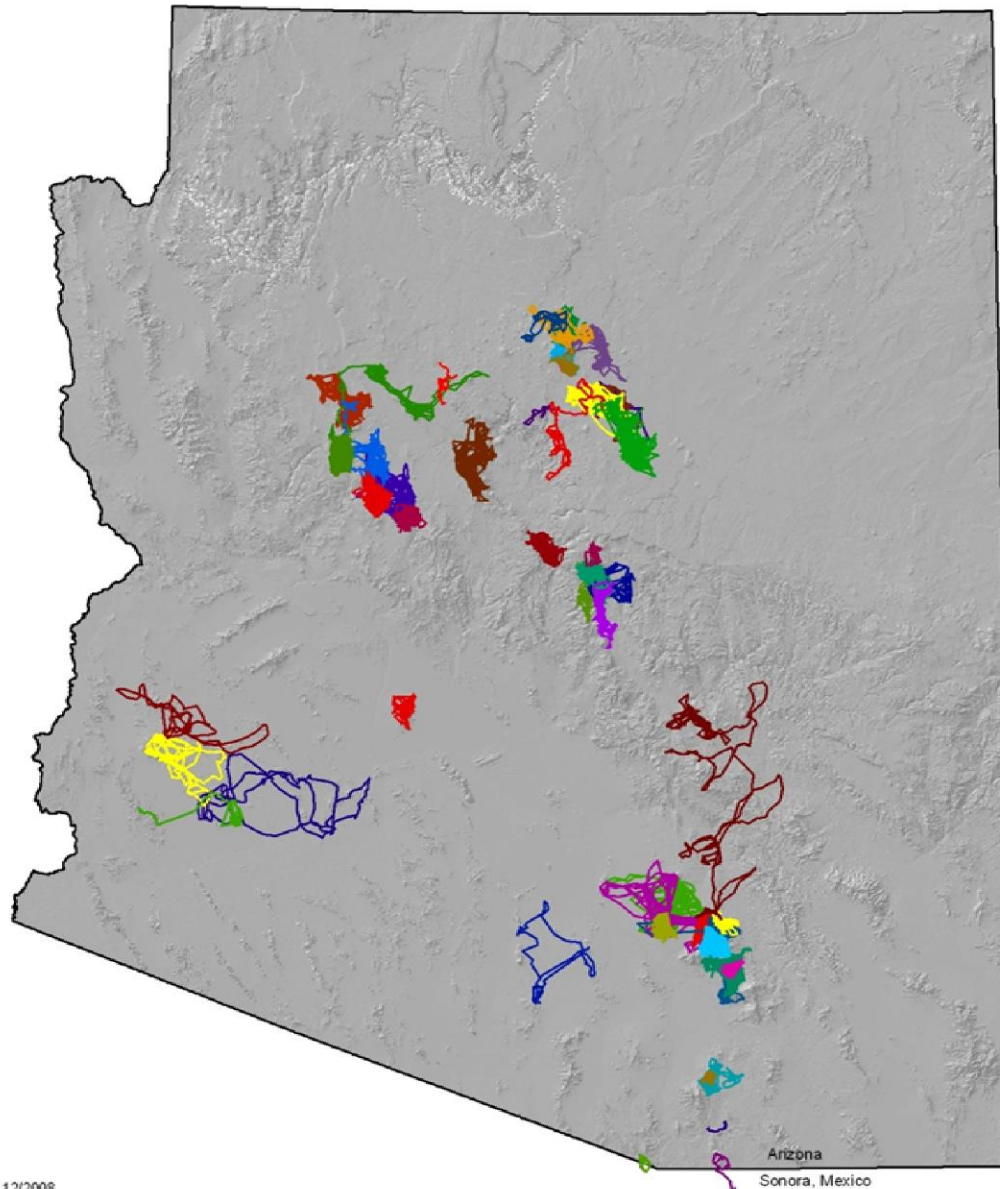


Base maps at a scale of 1:500,000 were created using Geographic Information System (GIS) software and data sourced from Arizona State Land Department ALRIS. Wildlife Managers from throughout Arizona drew on these base maps their impression of the mountain lion population within their district. These several regional maps were then digitized and assembled into a single statewide mountain lion distribution map. This map was completed in 2002.



Movements from GPS Collared Lions

Lines indicate movements
of individual animals. Data
collected from 8/2005 - 12/2008



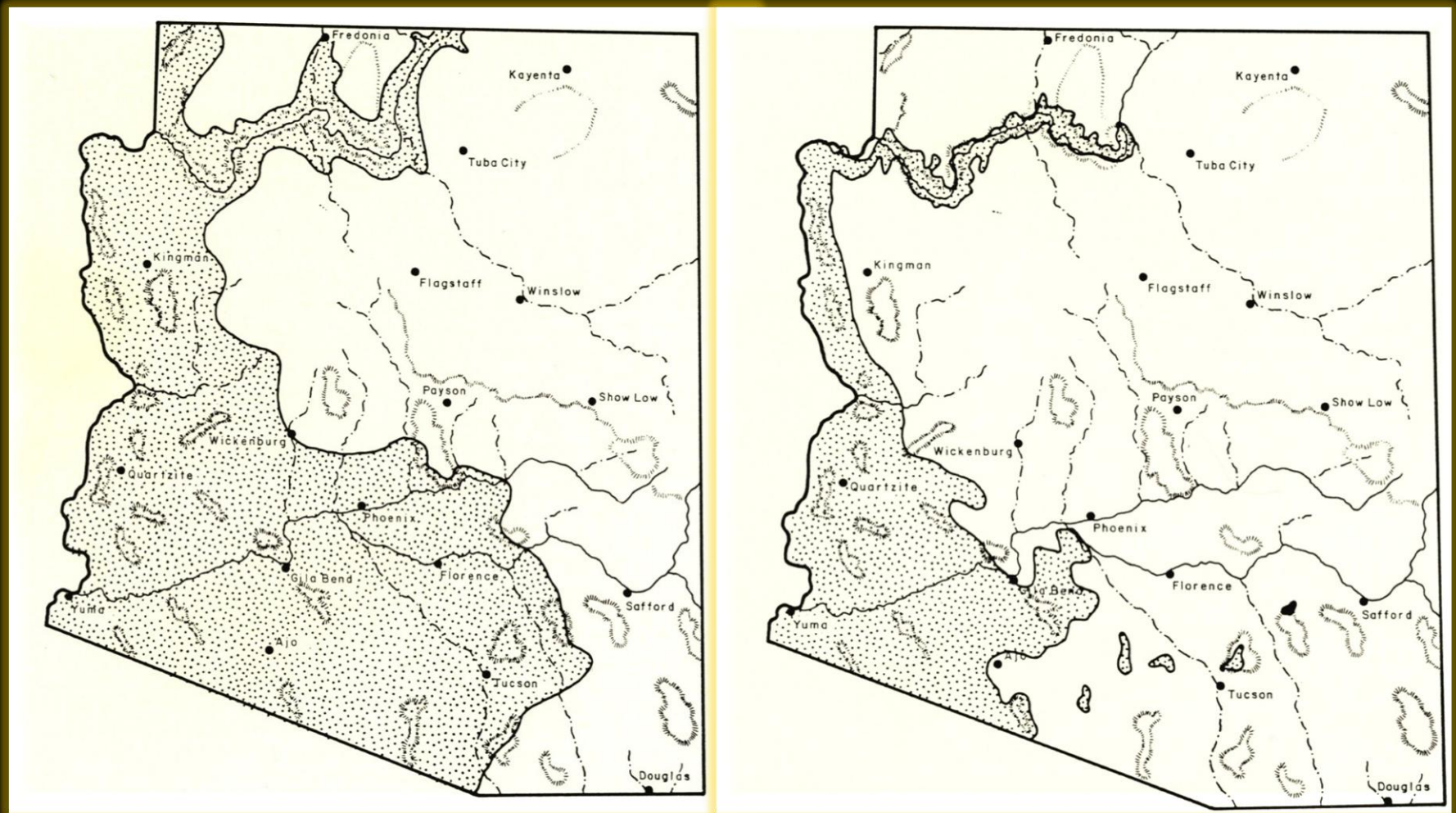
Data Sources:
AGFD, USGS, Kofa NWR

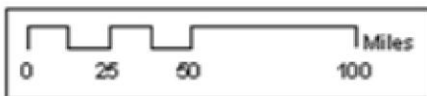
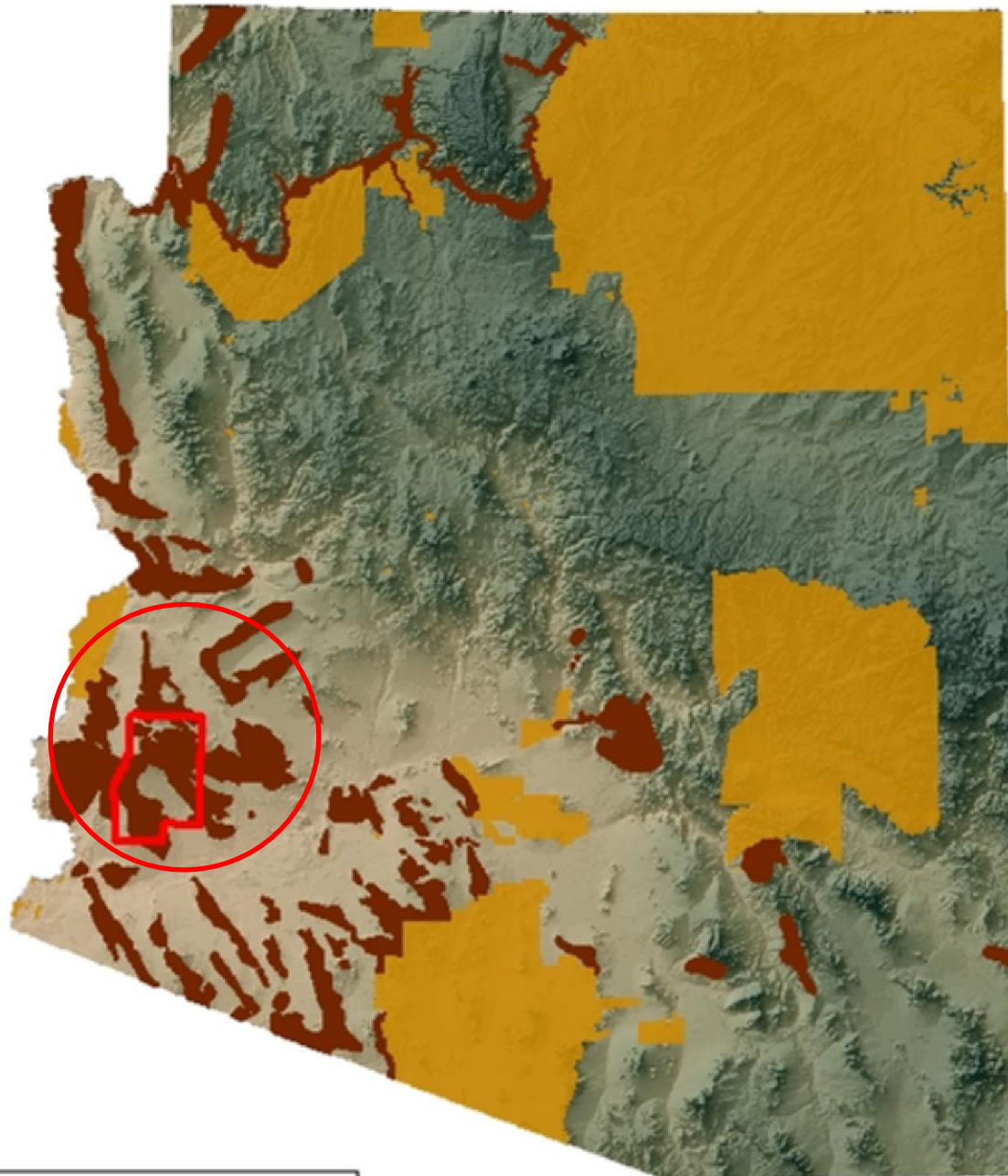


Yuma



Mountain lion GPS-tracks
(AGFD data, 2007-2009)

Bighorn sheep distribution: 1900 - 1960



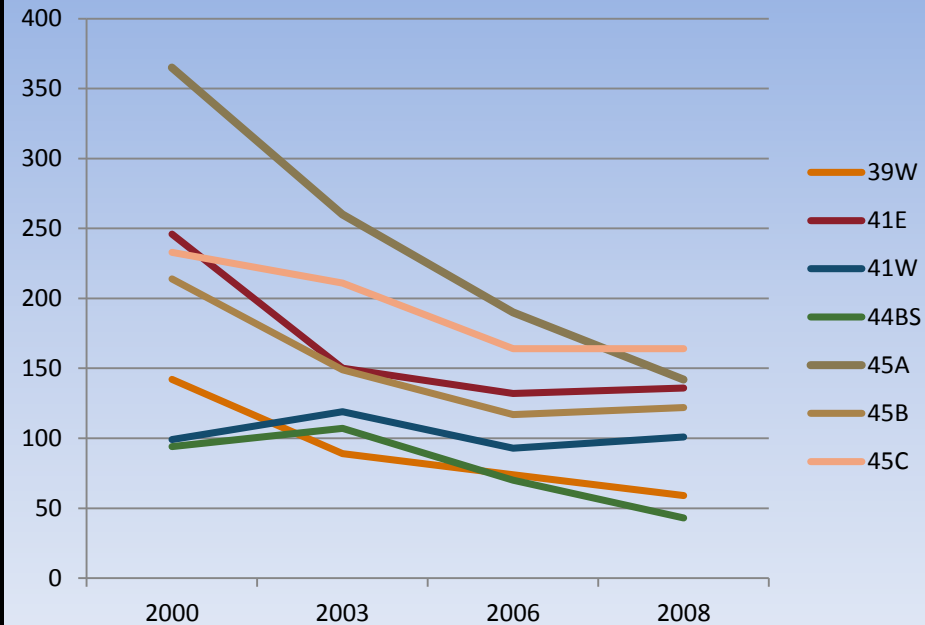
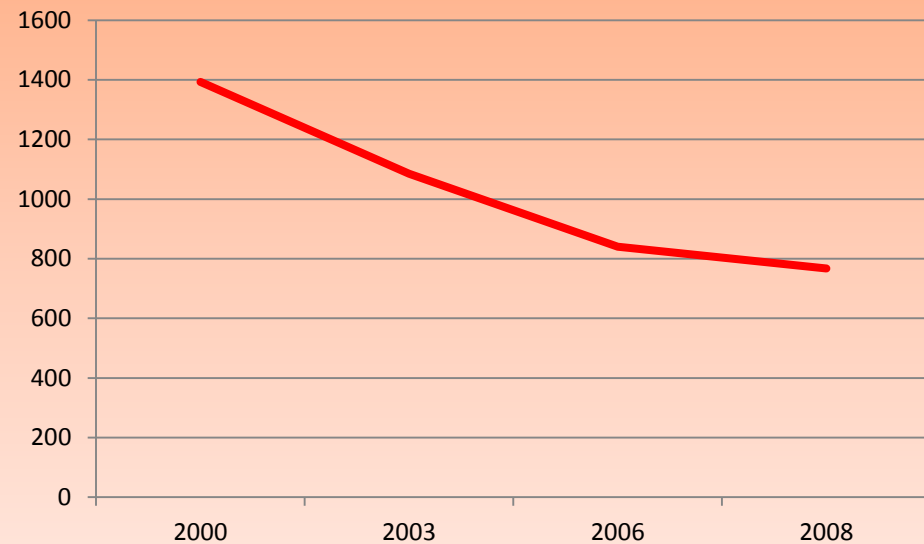


Legend

-  Bighorn Sheep
-  Tribal Lands

Sheep population trends: 2000 - 2008

Total All Units



- 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

Population Size Estimates (USFWS)



Disease **Hunting** **Drought** **Predation**

OBJECTIVES

Number of Mountain Lions on Kofa NWR

Diet Composition of Mountain Lions and Bobcats











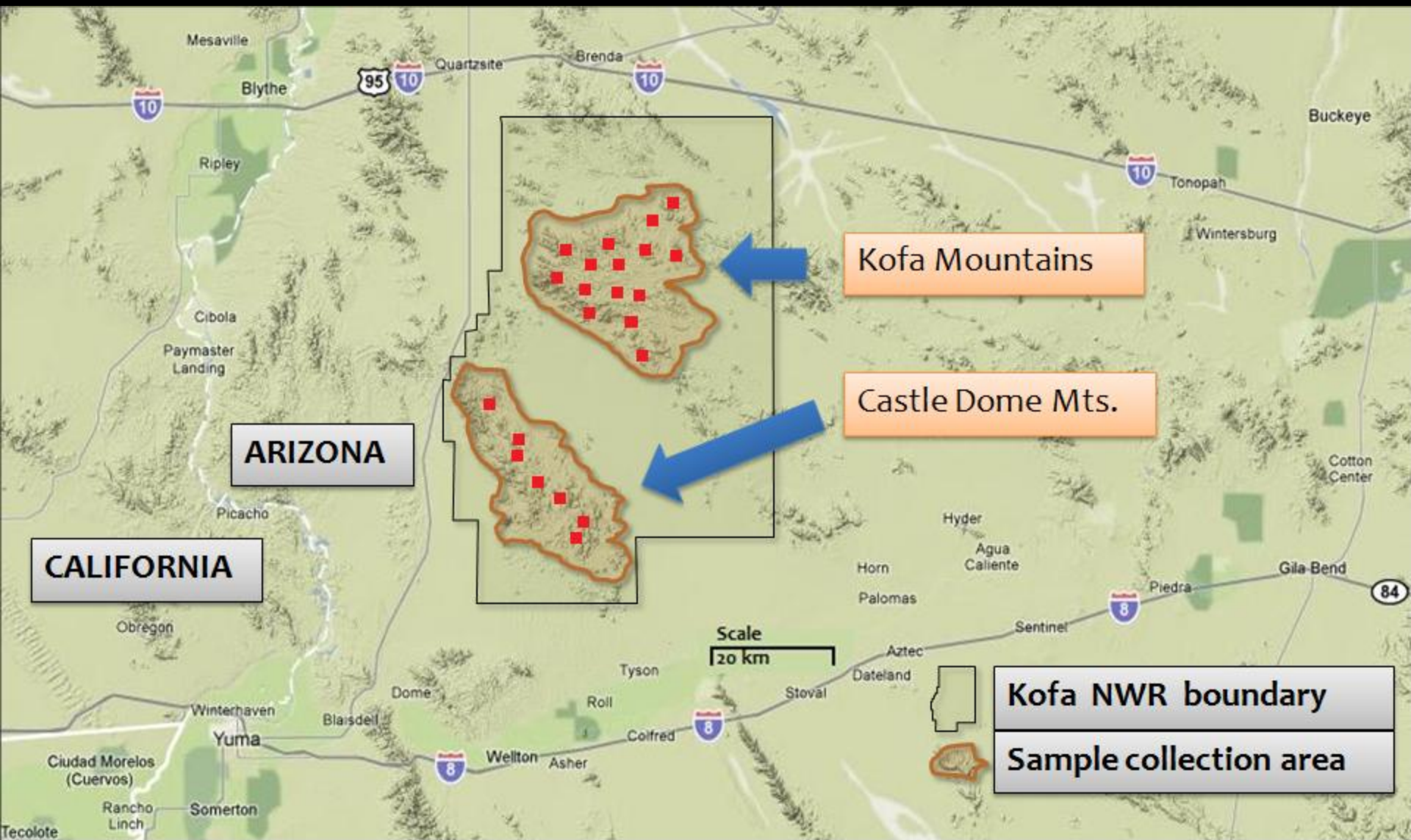


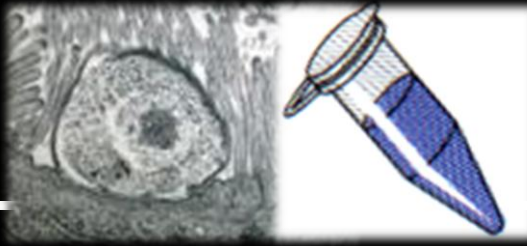




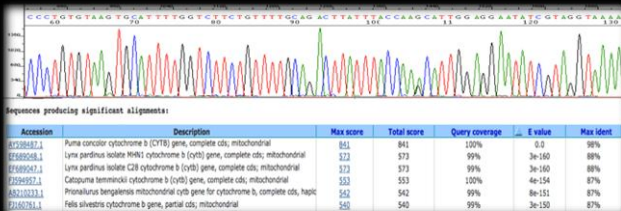


Mountain lion scat sample locations (red dots)

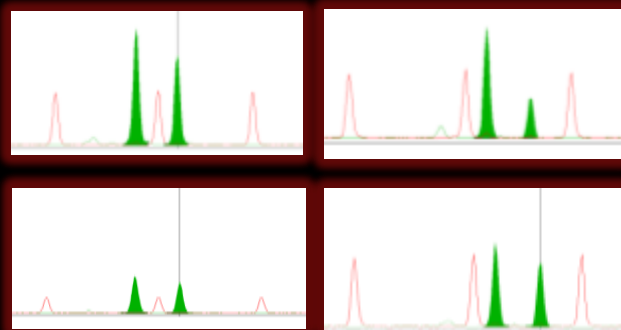




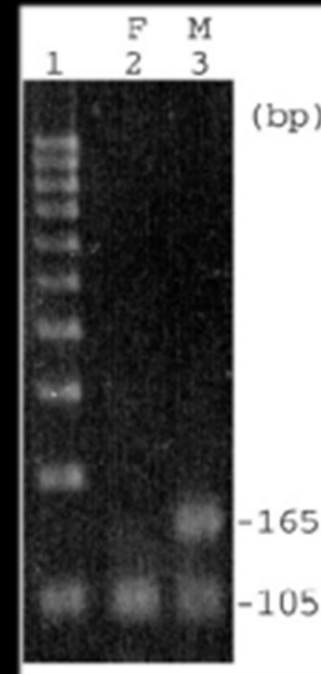
DNA extraction



Species ID



Individual ID



Sex ID

Mountain Lion Sample Analysis Summary

	# Scats	Success %
Analyzed (for Species ID)	105	
Success	58	55%
Analyzed (for Individ. ID)	54 (puma)	
Success	23	43%
# Individual pumas	11	
# Males : Females : ?	6 : 2 : 3	72%



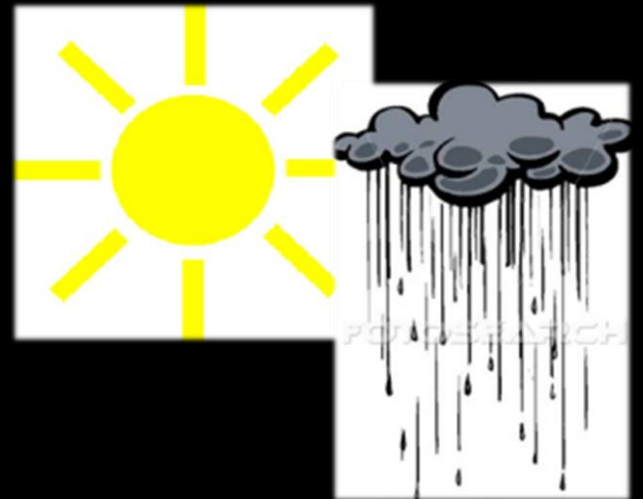
54



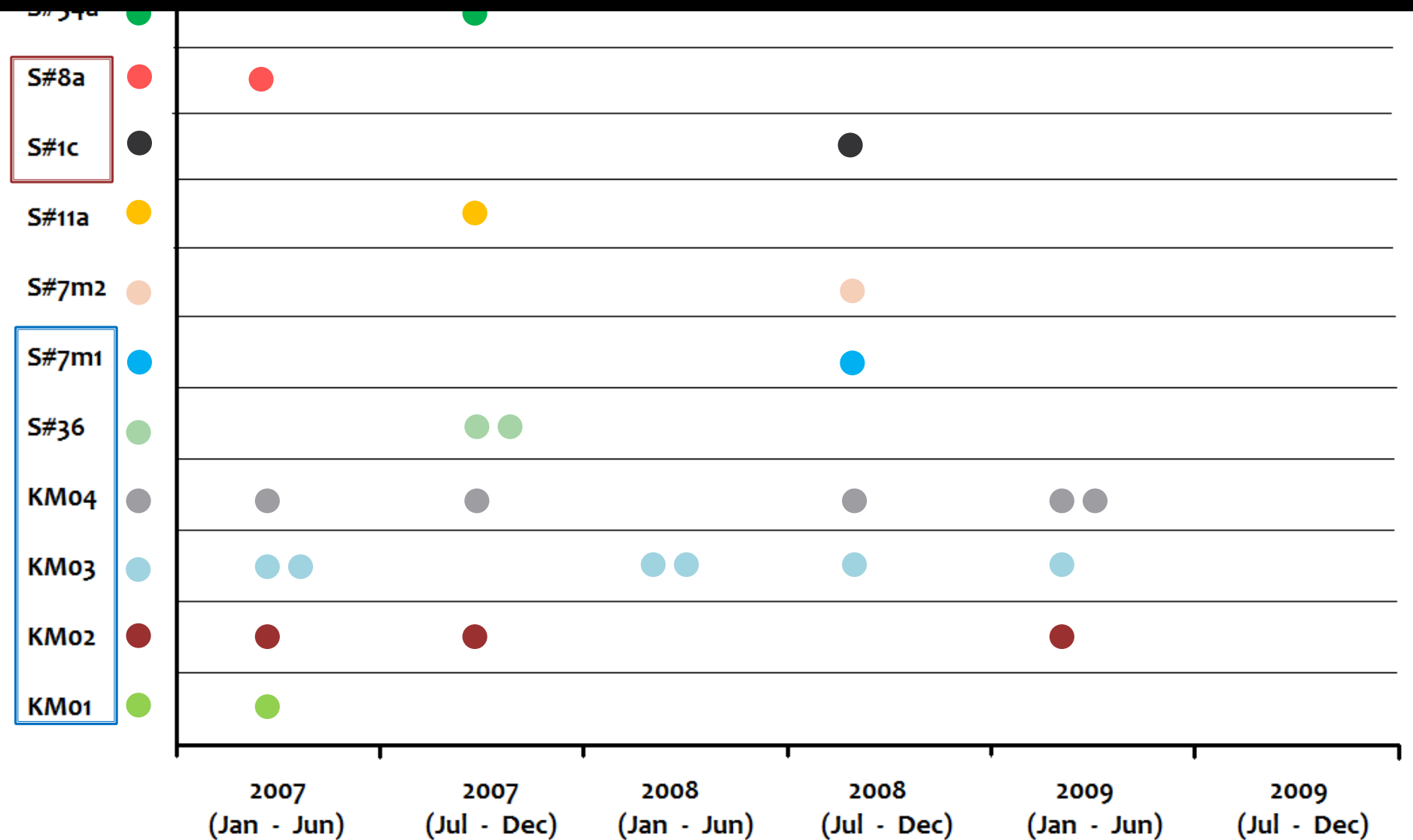
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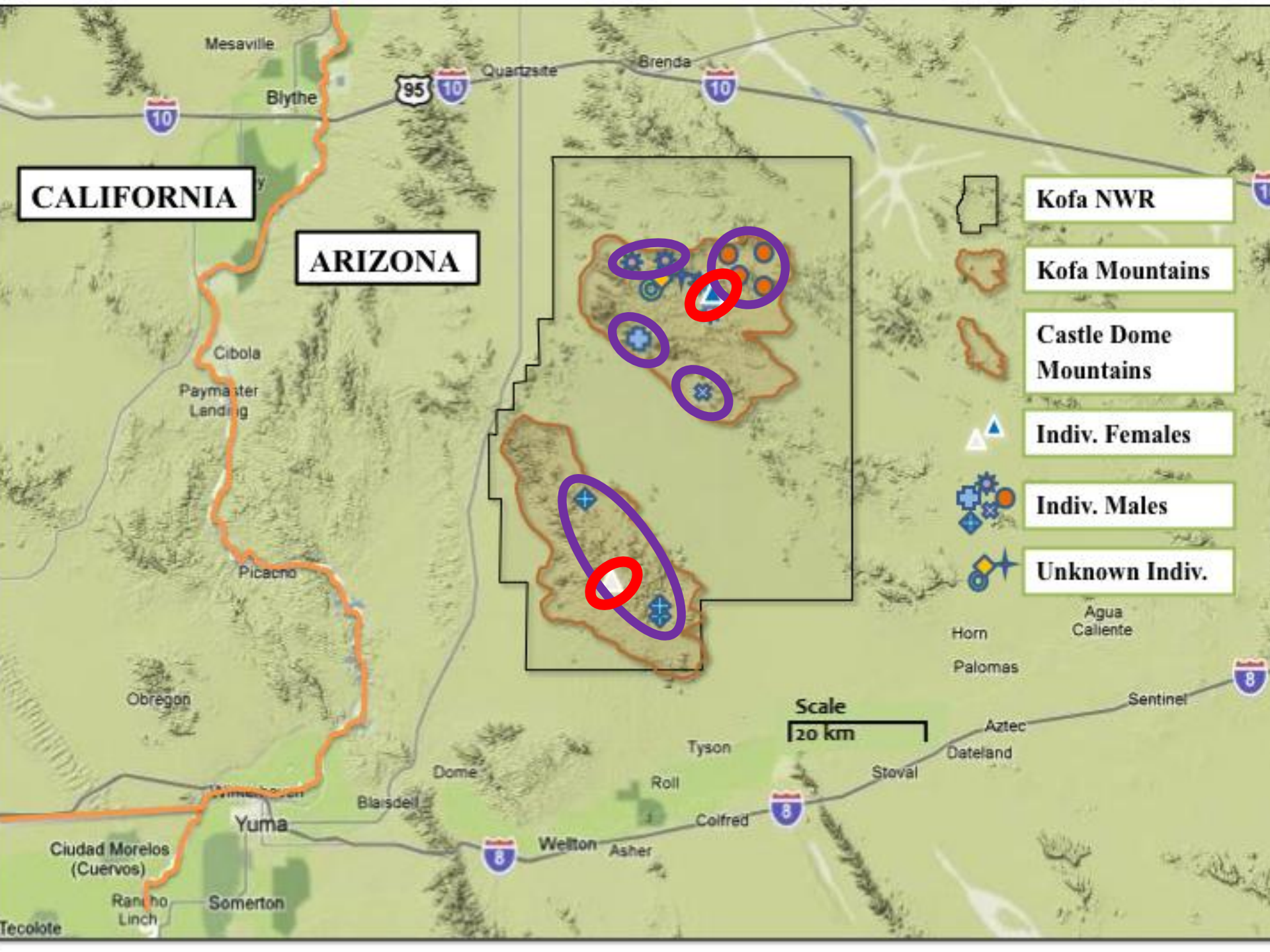


3



11 Individual Mountain Lions – Captures Over Time

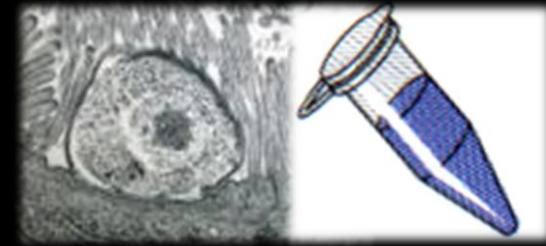
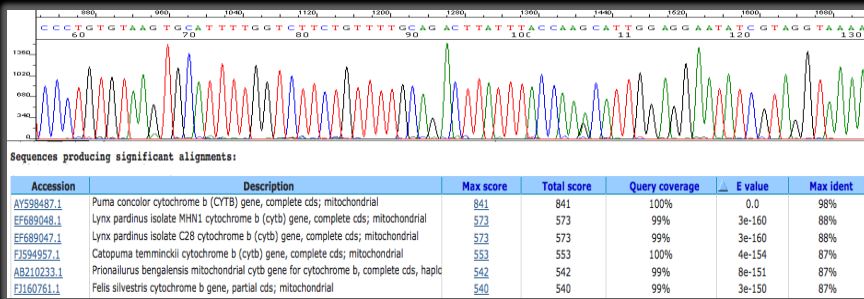




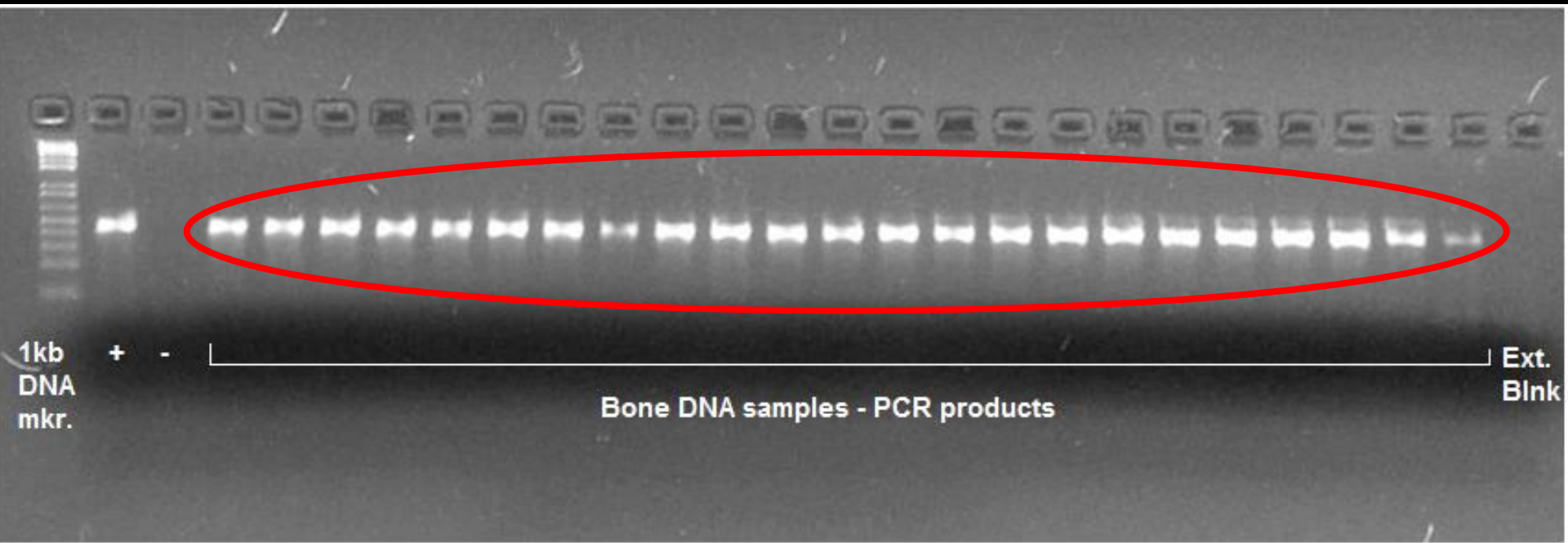
54

Prey Species Identification

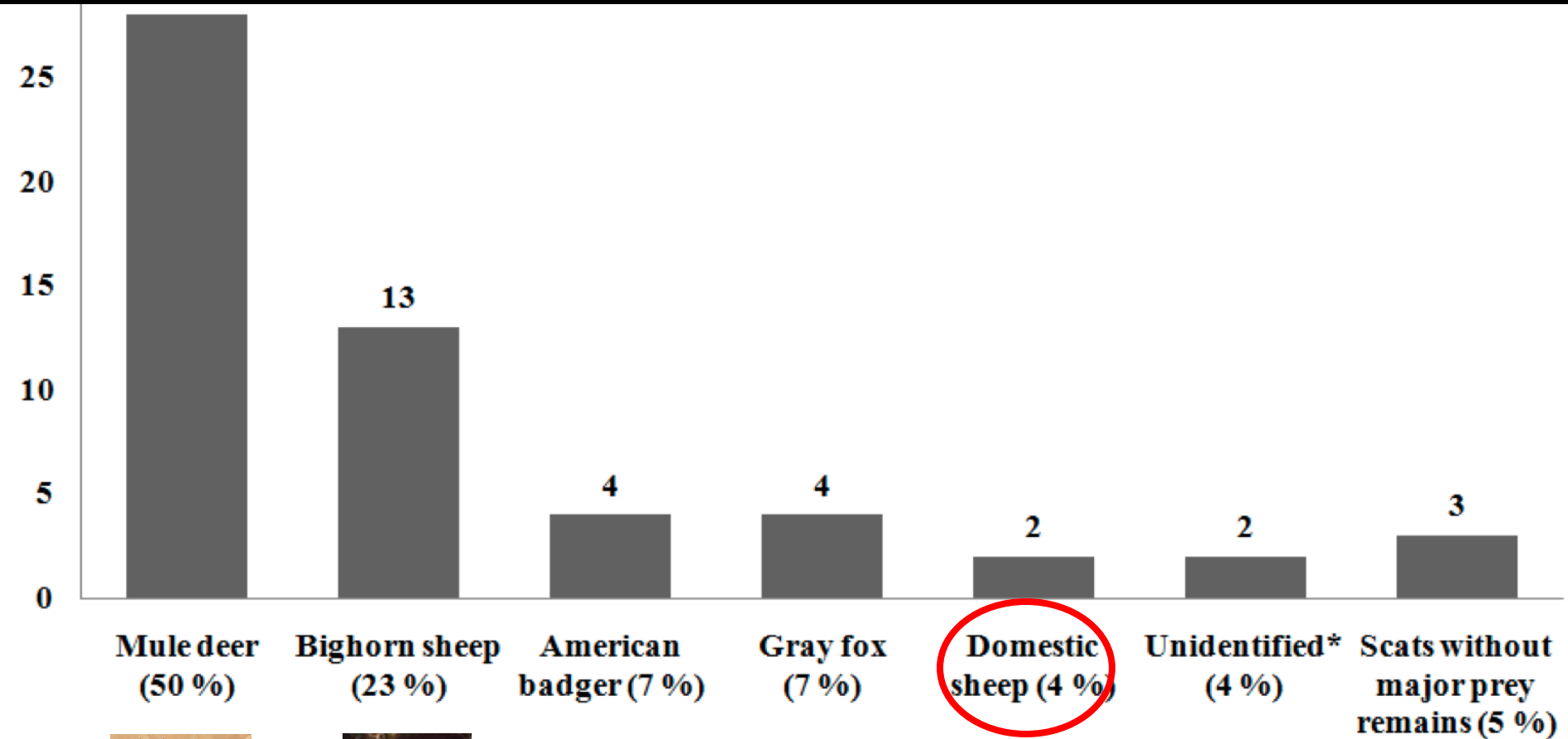
51



Prey species identification success ~ 100%



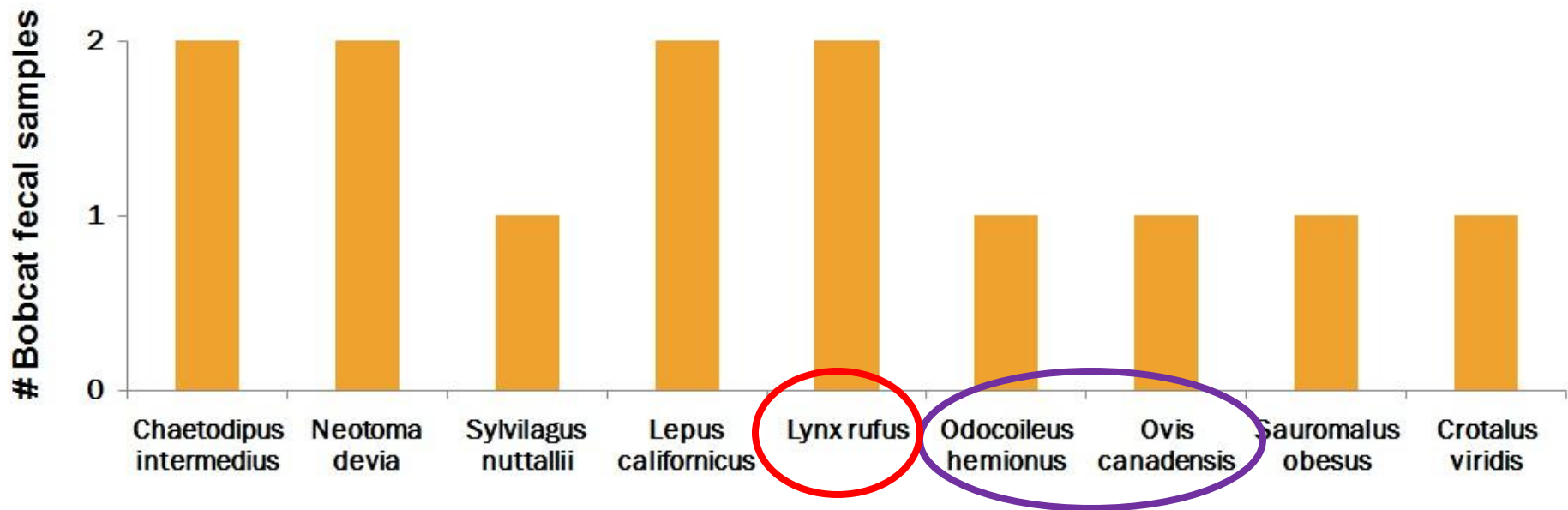
Diet composition – Mountain Lions



Diet composition - Bobcats



Prey remains identified from n=13 bobcat scat samples from Kofa NWR



Summary - Implications

11 individuals – Including 6 males, 2 females

Primary prey – Mule deer, Bighorn sheep

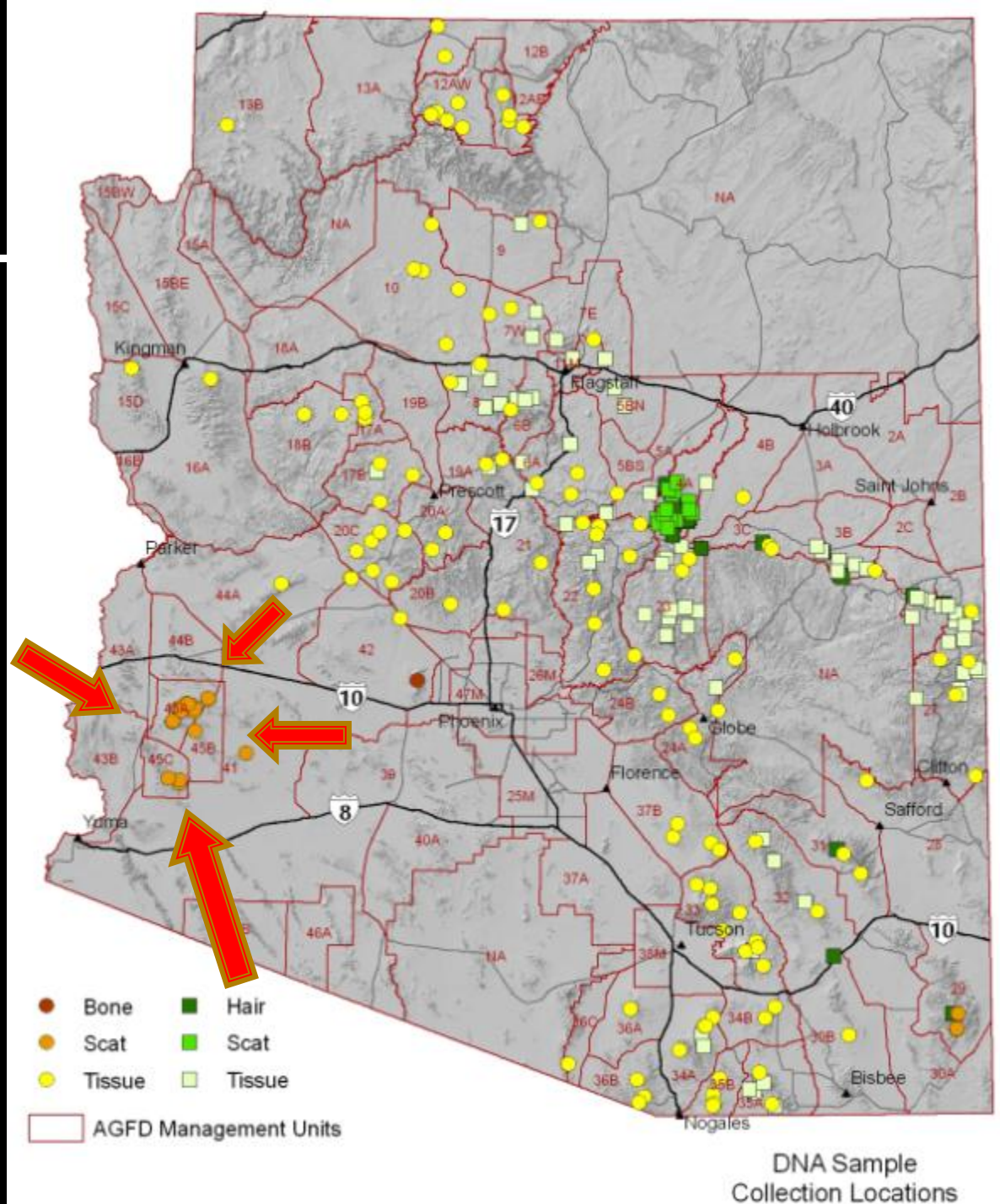
Bobcat diet – Prey species

Genetics greatly added to camera and GPS data

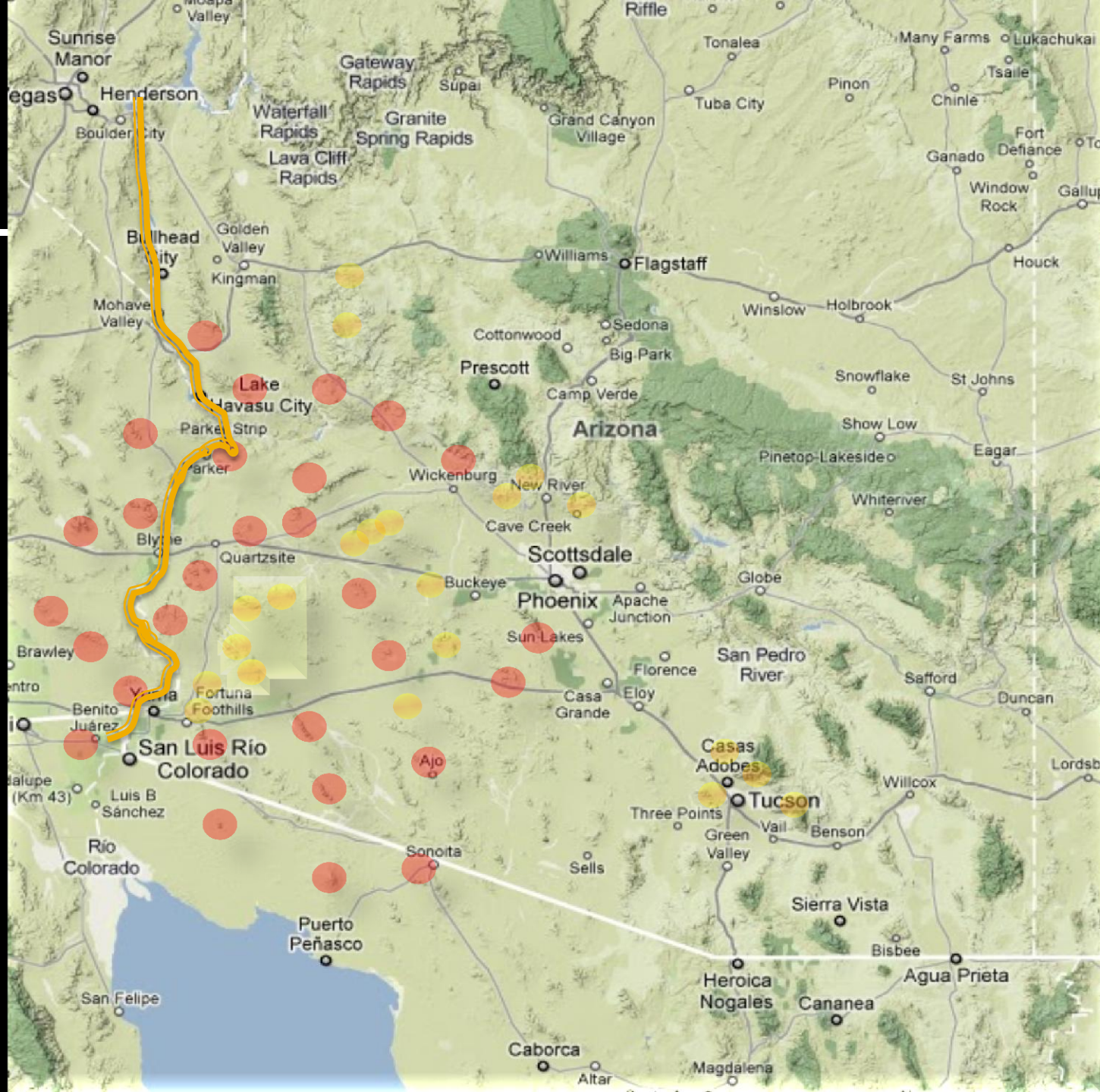
Predation risk assessment for bighorn sheep

Designation of management units

Source Population Identification

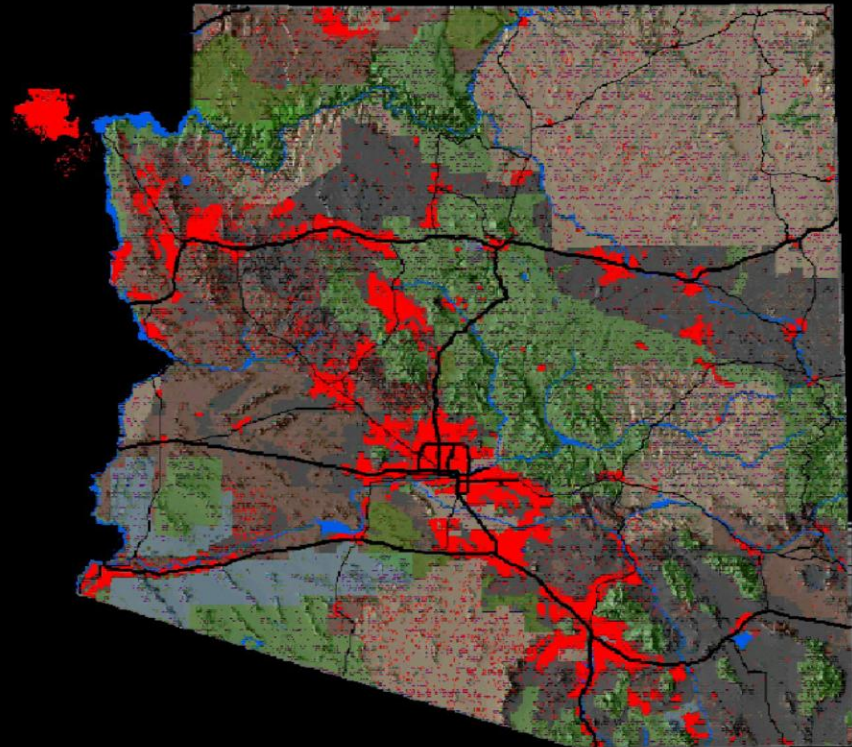
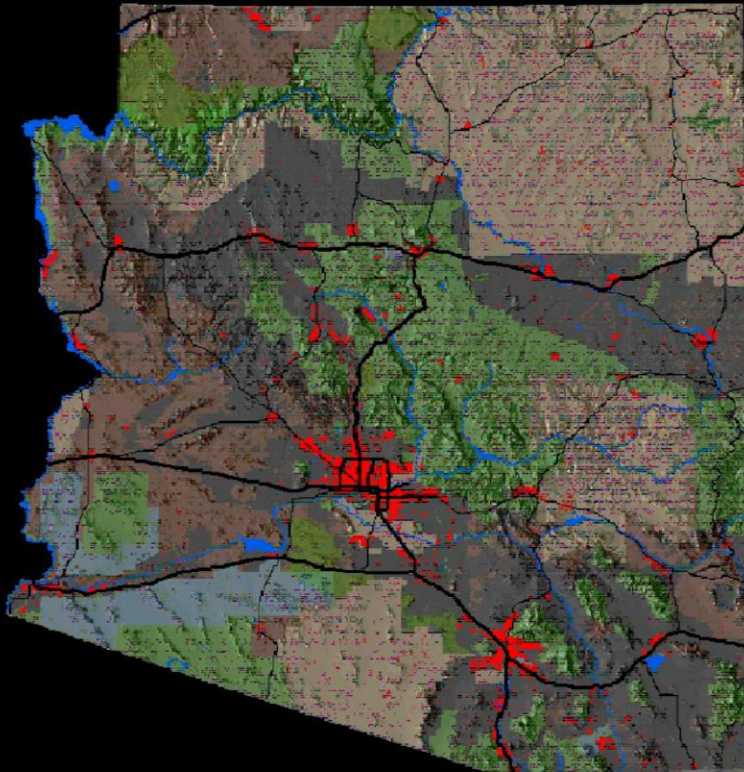


Current Study Area



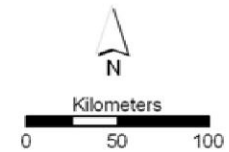
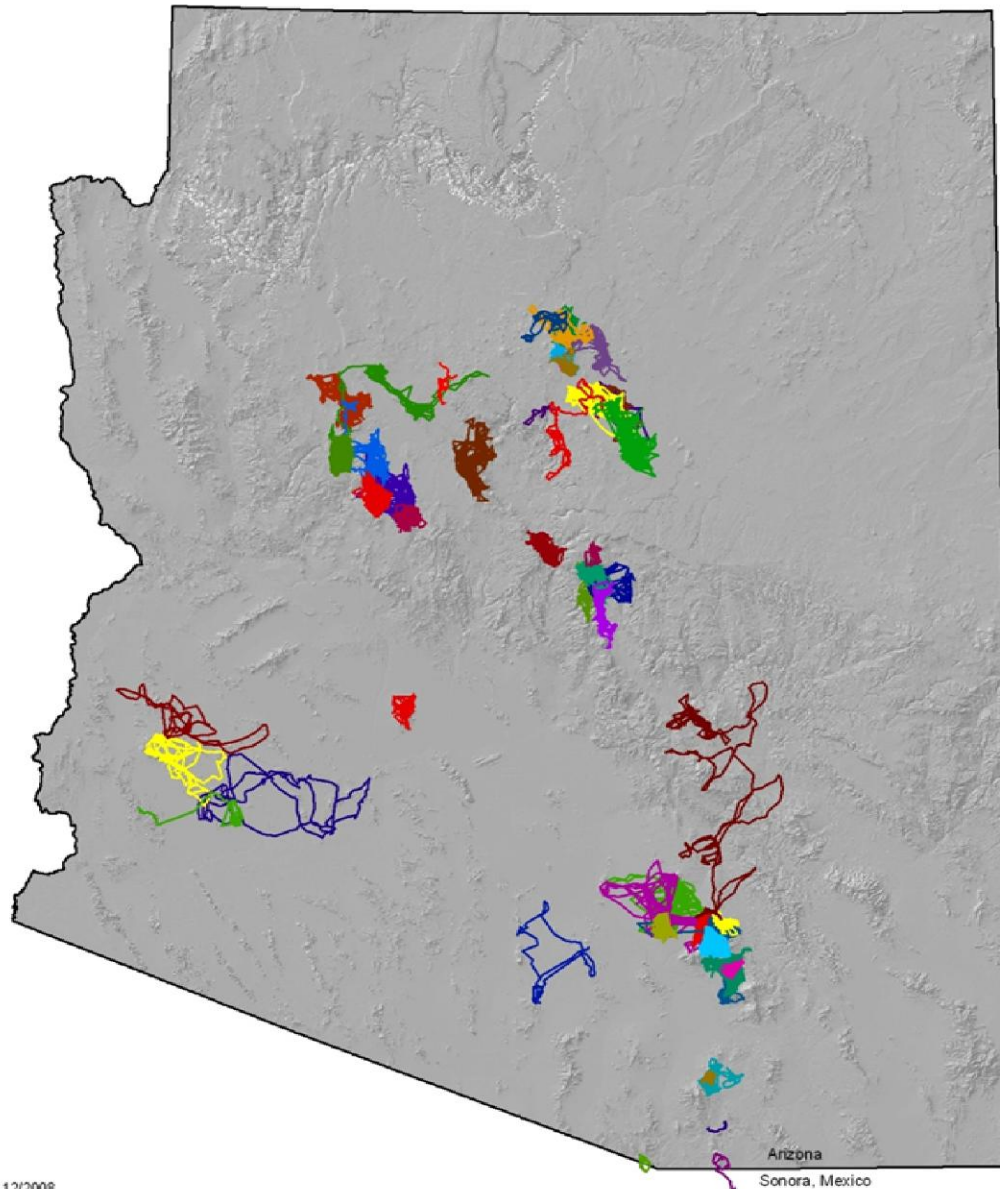


Projected Urbanization 2007 - 2050



Movements from GPS Collared Lions

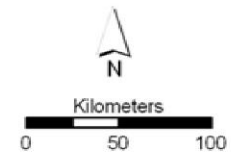
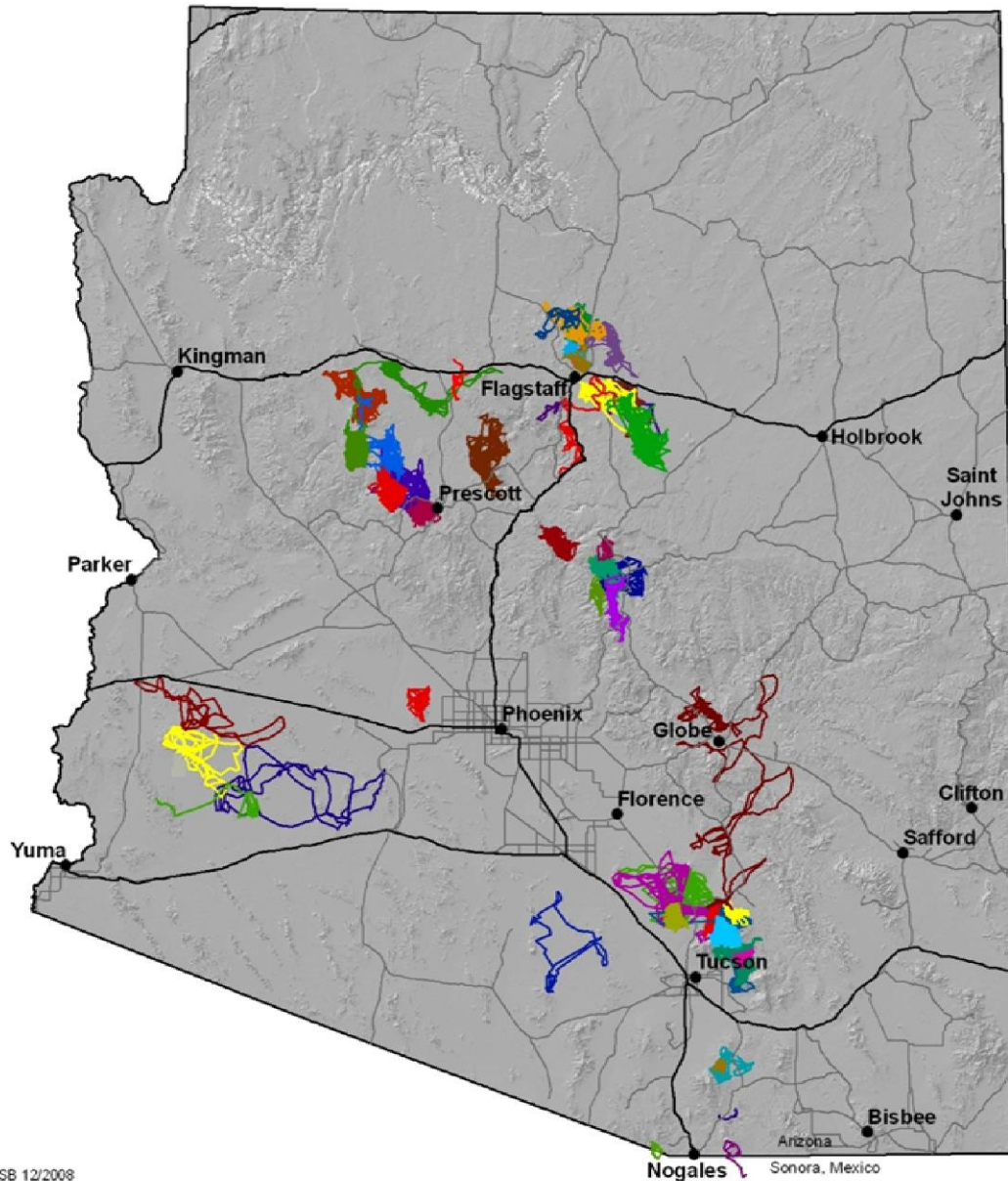
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Movements from GPS Collared Lions

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Questions

1. Human created barriers = gene flow barriers?

GIS models (estimate) vs. Genetic data (truth)

2. Source Population Identification

3. Population size estimate – Habitat type?

4. Diet/Food Habits – Prey selection behavior?

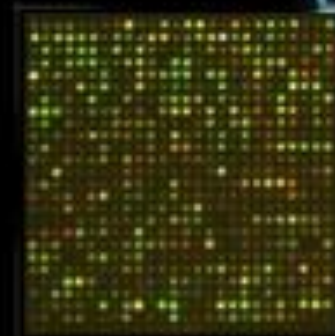
More New Tools ...

Mt. Lion SNP Genotyping

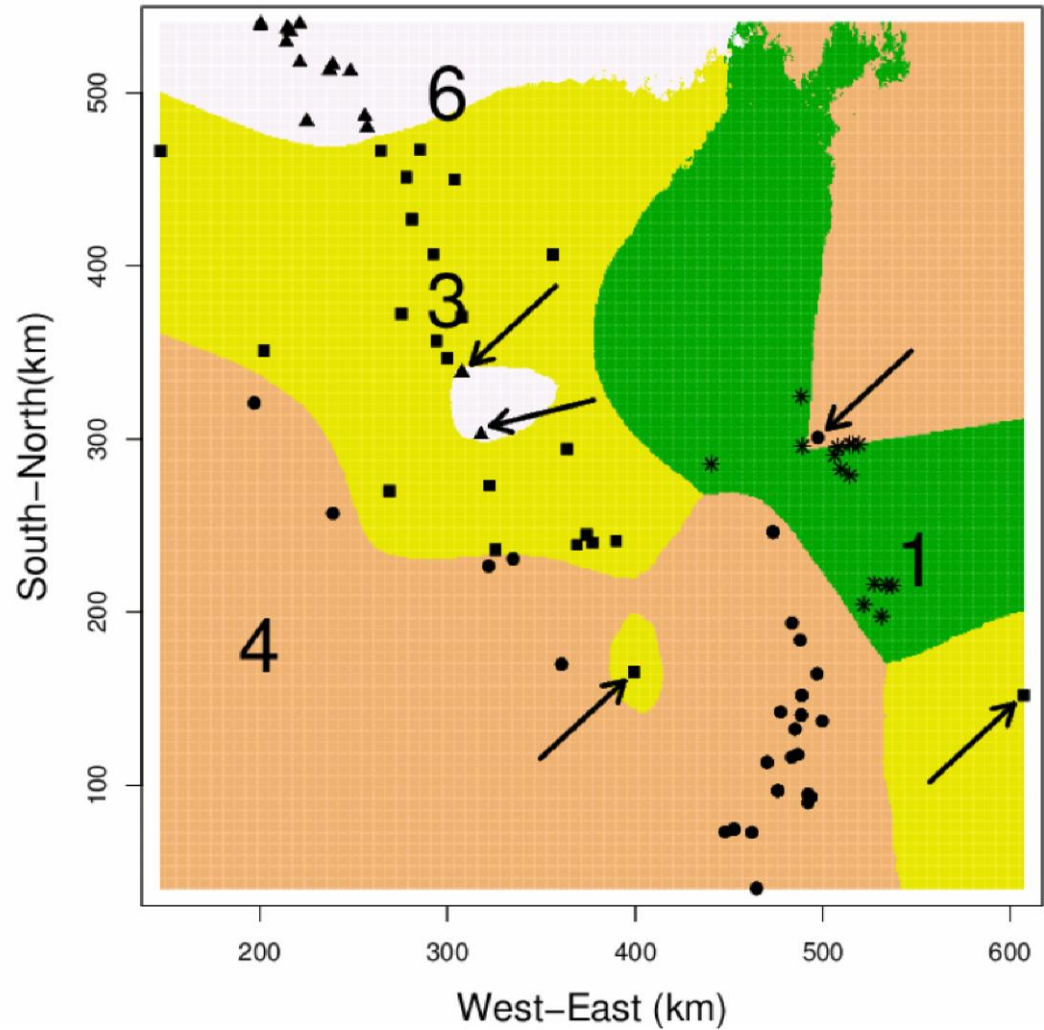
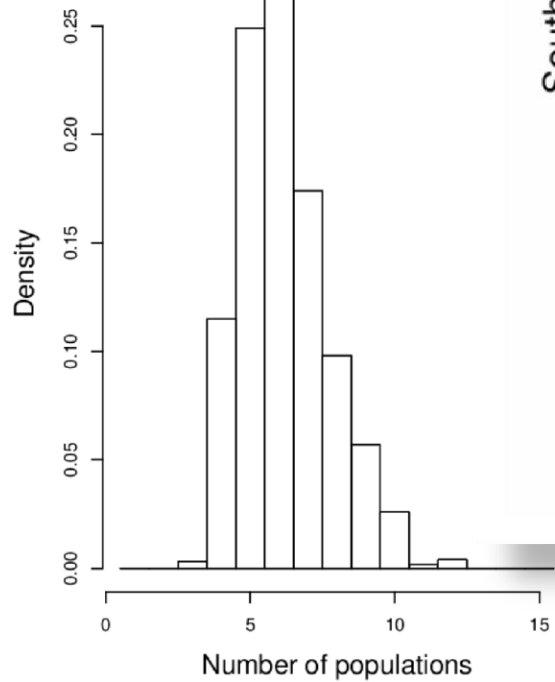


Photograph by Stephen Lea, 2003

Bob Fitak, Dept. of Genetics, Univ of Arizona
Dr. Melanie Culver, Univ of Arizona
Ron Thompson, AZGFD
Dr. Mike Shwartz, Univ. of Montana



Population Structure



Seeking Mountain Lion Samples ...





SPECIES

SEX



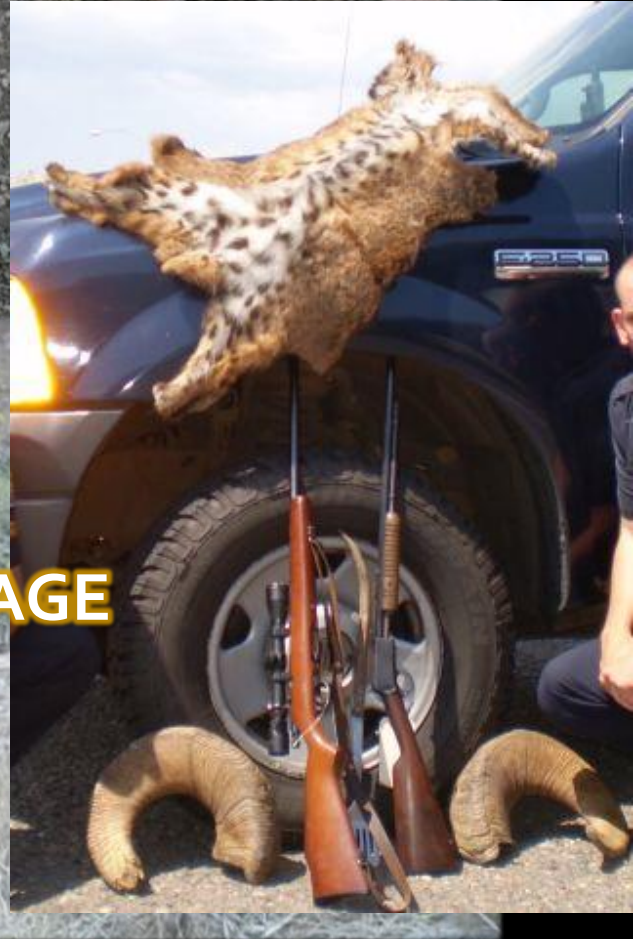
INDIVIDUALS



SOURCE POPULATIONS

RELATEDNESS – KINSHIP/PARENTAGE

DIET





Project of the Month – www.catsg.org

IUCN / SSC Cat Specialist Group

IUCN
The World Conservation Union

SSC
Species Survival Commission

CAT SPECIALIST GROUP
SPECIES SURVIVAL COMMISSION

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Genetic Analysis of *Puma concolor* feces
from Kofa NWR Arizona



Ashwin Nanda Lindsay Smithe Sam Thompson Melissa Culver

The University of Arizona USGS

Project of the Month

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Who we are and what we do

Bulletin Board
News, Statements, Fact Sheets, Reports, Strategies

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Thank You | Gracias



Desert Bighorn Council



*Wild Felid
Research & Management Association*



Arizona Desert Bighorn Sheep Society

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