Genetic Assessment of Mountain Lions in SW Arizona

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OVERVIEW

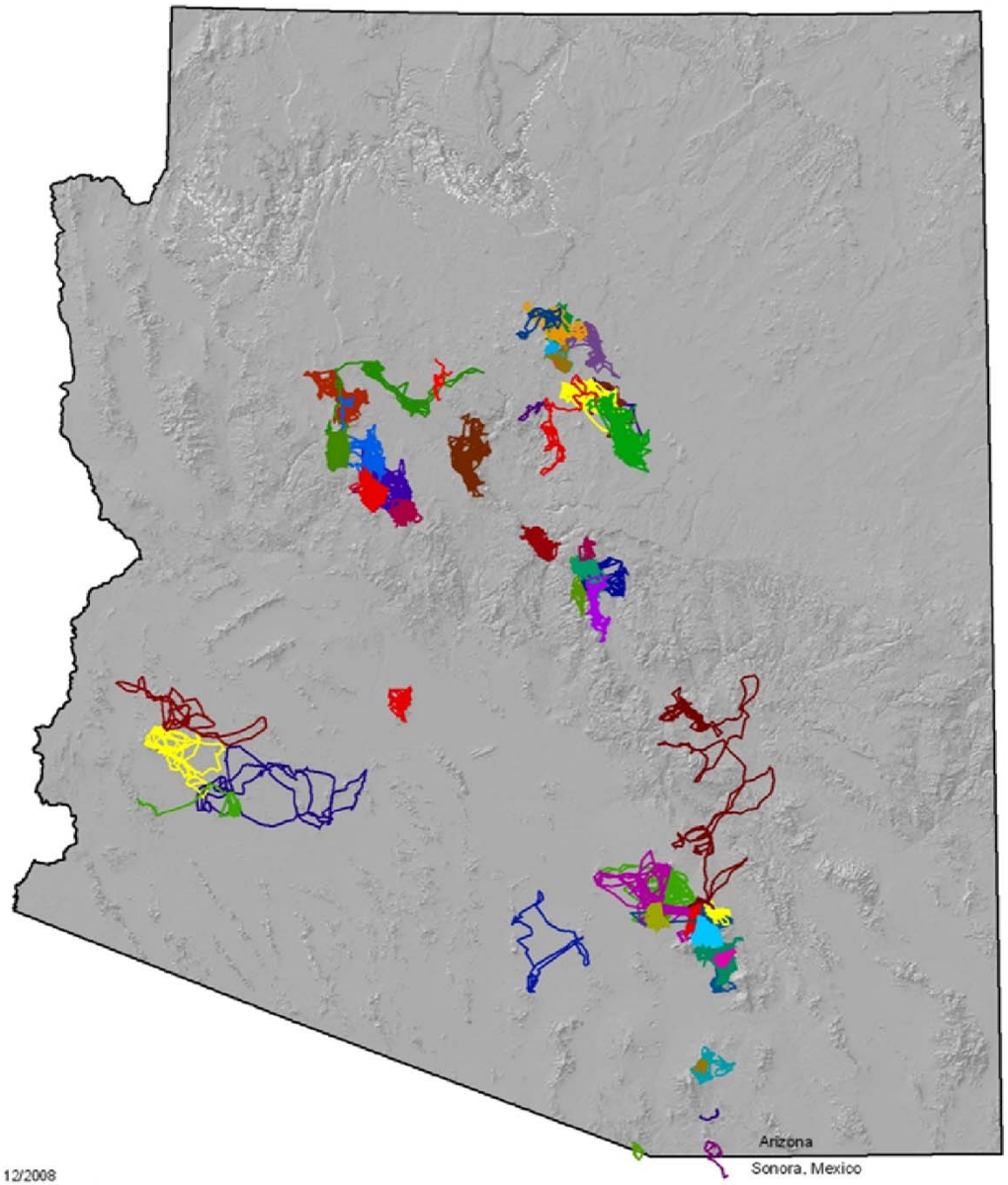
Concerns about Mountain Lions in AZ

Using Genetics to Study Mountain Lions

From Genetics to Genomics & Databases

Source of Mountain Lions on Kofa NWR?

Collaborative Opportunities



Movements from GPS Collared Lions

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

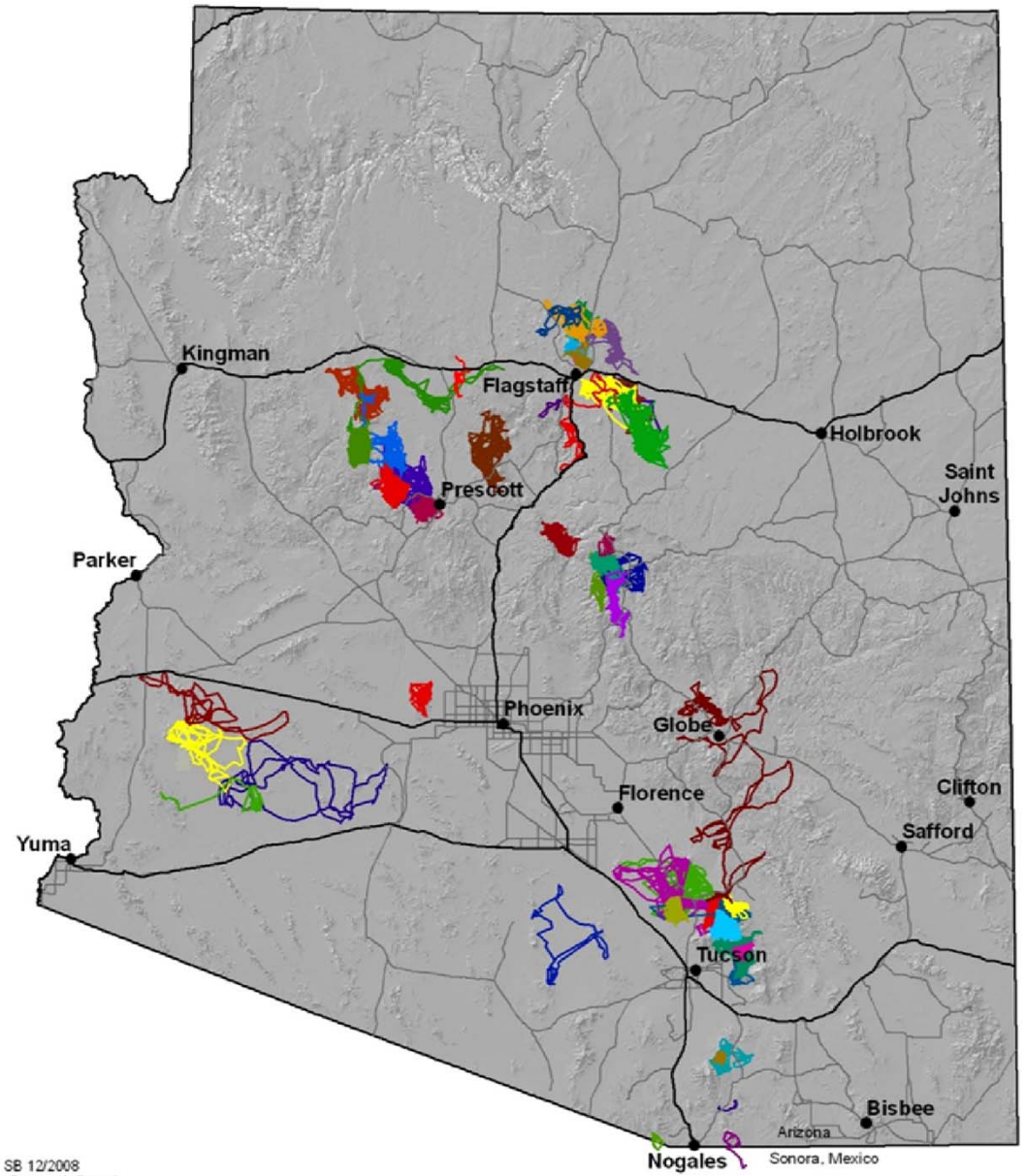
N

Kilometers

0 50 100

Data Sources:
AGFD, USGS, Kofa NWR

SB 12/2008
AGFD, Research Branch



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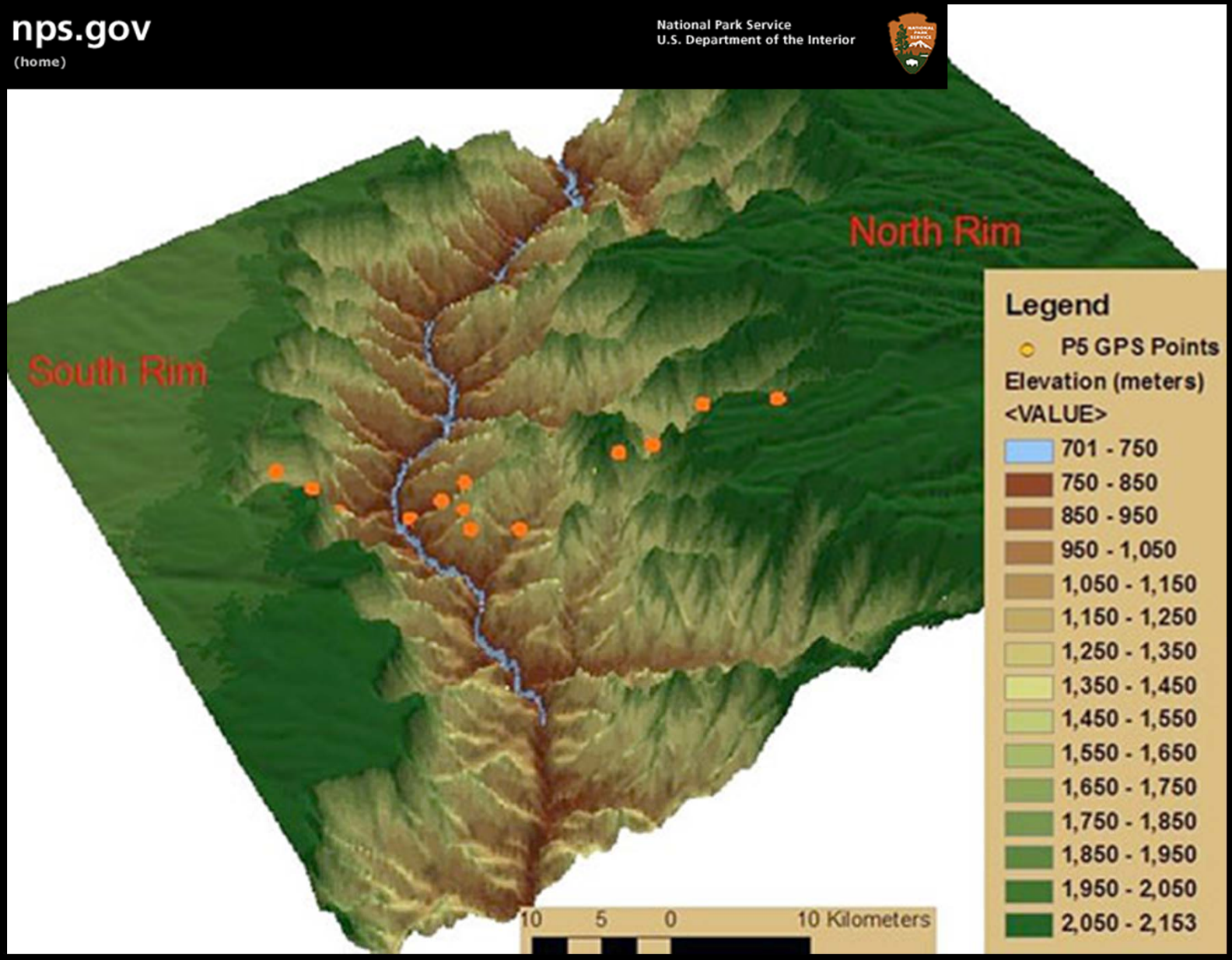
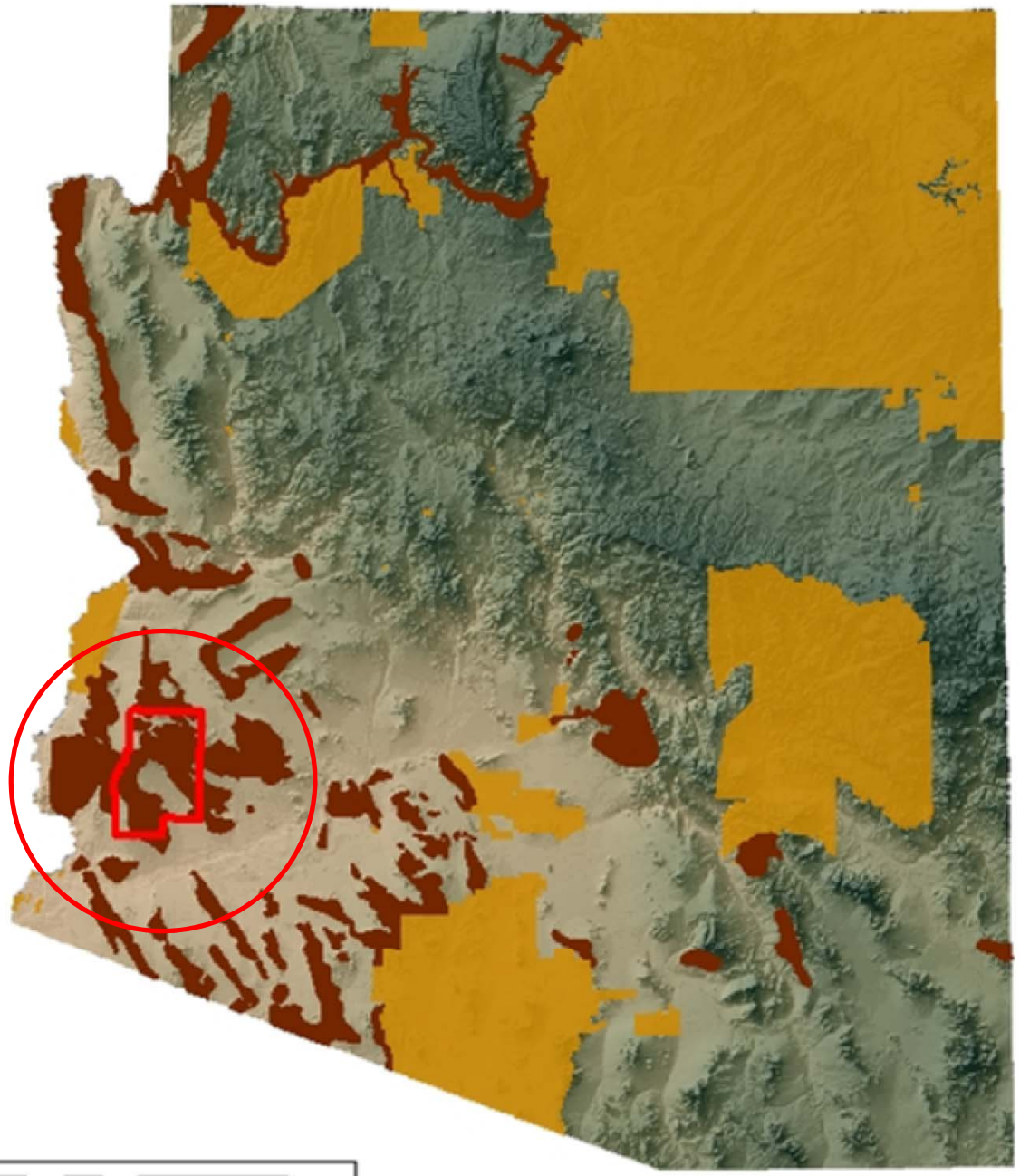
nps.gov
(home)

National Park Service
U.S. Department of the Interior

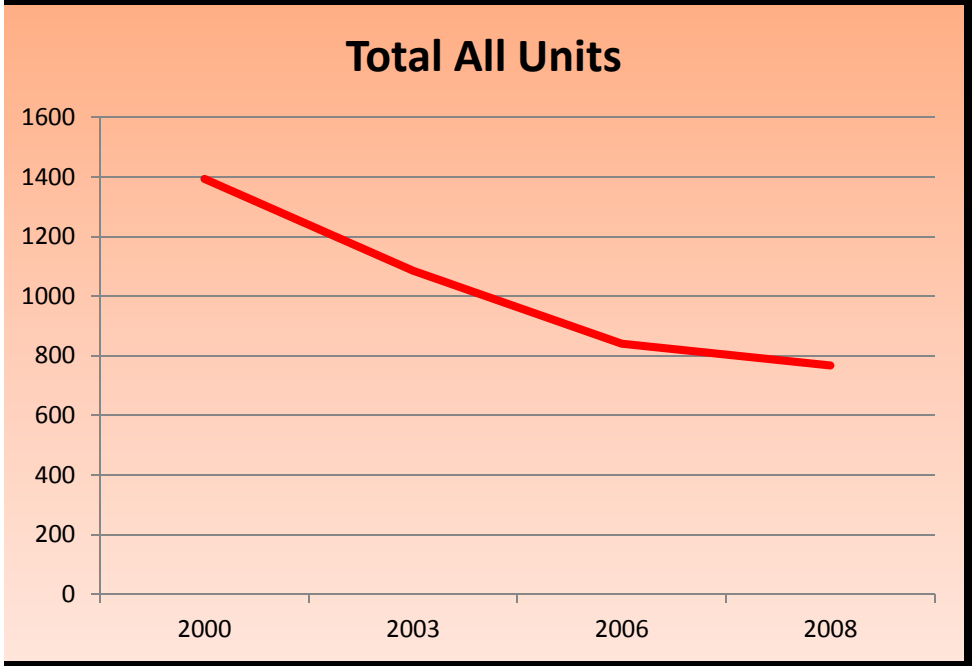


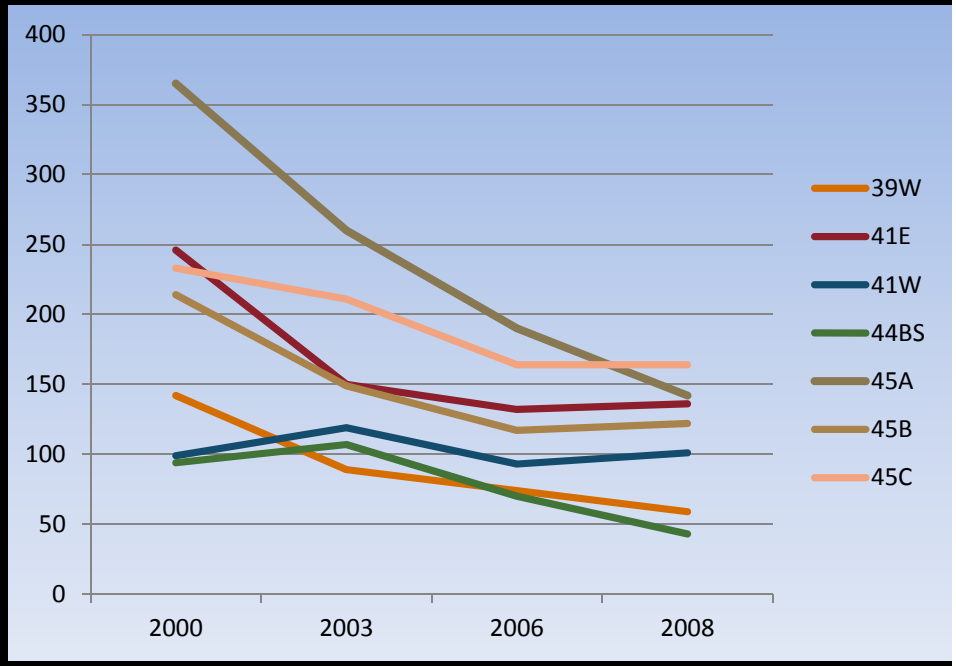


Legend

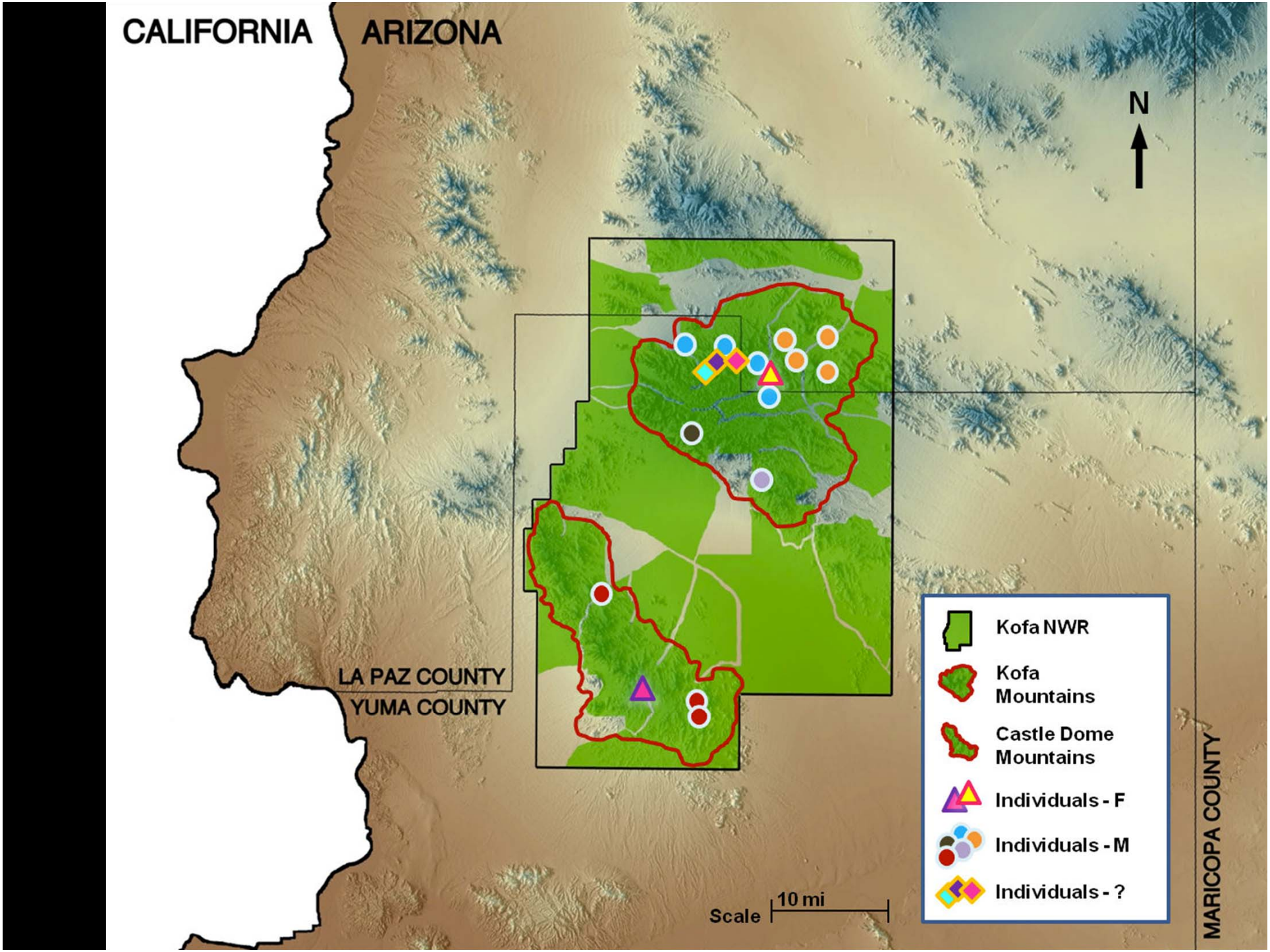
- Bighorn Sheep
- Tribal Lands

Sheep population trends: 200 - 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


CALIFORNIA
ARIZONA
N
LA PAZ COUNTY
YUMA COUNTY
MARICOPA COUNTY
Kofa NWR
Kofa Mountains
Castle Dome Mountains
Individuals - F
Individuals - M
Individuals - ?
Scale
10 mi

Naidu et al. 2011

Minimum number and sex of mountain lions on Kofa NWR

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Notes

Genetic Analysis of Scats Reveals Minimum Number and Sex of Recently Documented Mountain Lions

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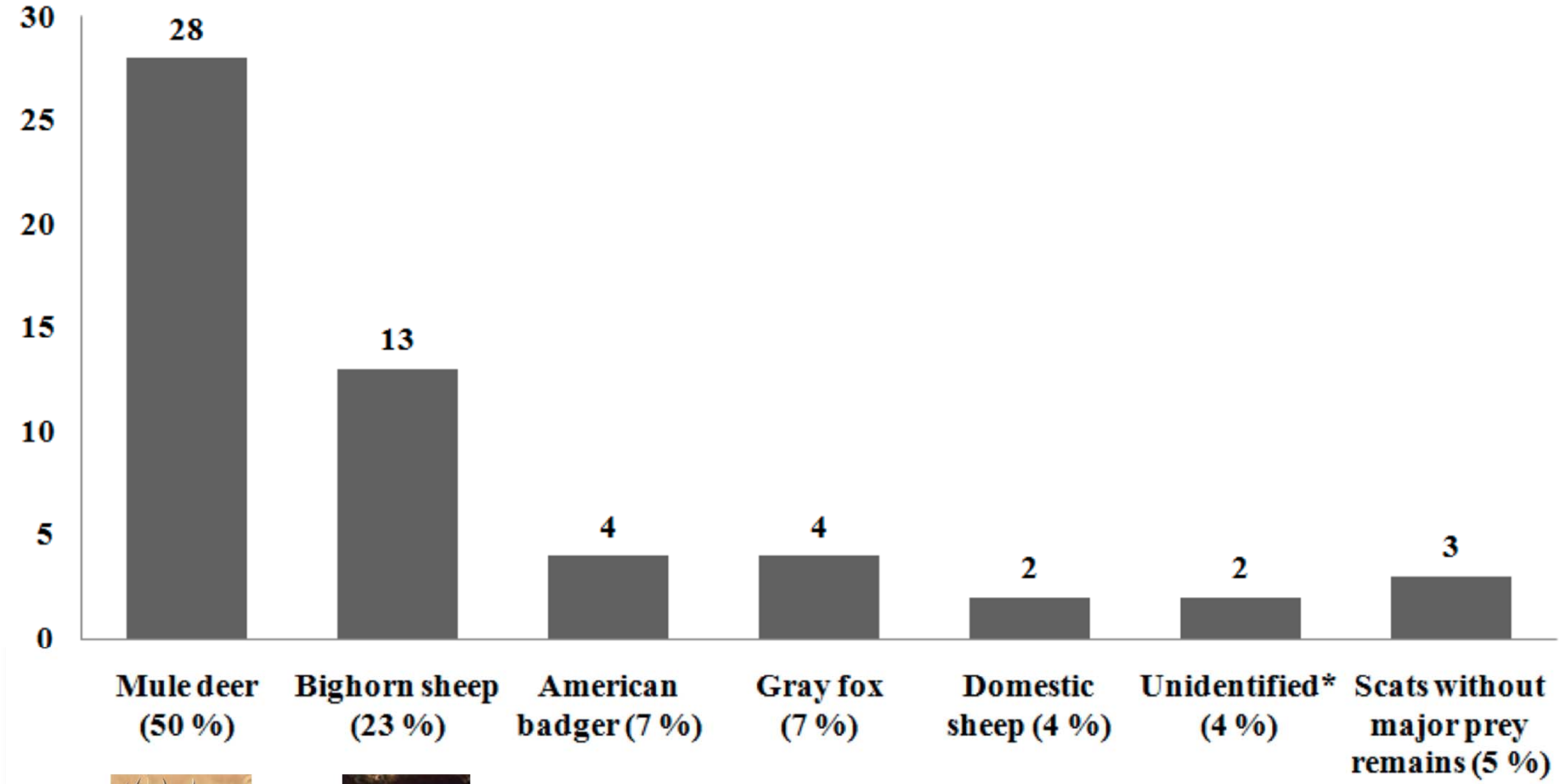
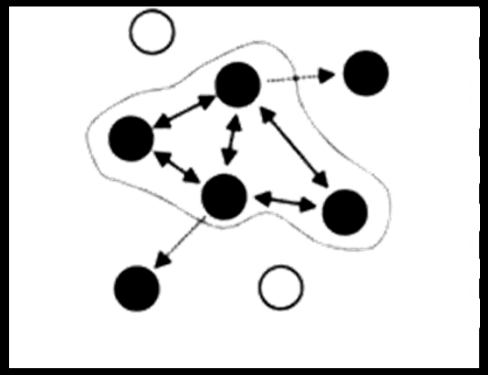
L.A. Smythe, U.S. Fish and Wildlife Service, Kofa National Wildlife Refuge, 9300 East 28th Street, Yuma, Arizona 85365
R.W. Thompson, Arizona Game and Fish Department, 5000 West Carefree Highway, Phoenix, Arizona 85086

Recent records of mountain lions *Puma concolor* and concurrent declines in desert bighorn sheep *Ovis canadensis mexicana* on Kofa National Wildlife Refuge in Arizona have prompted investigations to estimate the number of mountain lions occurring in the refuge. We performed non-invasive genetic analyses and identified species, individuals, and sex from scat samples collected from the Kofa and Castle Dome Mountains in the refuge. From 105 scats collected, we identified a minimum of 11 individual mountain lions. These individuals consisted of six males, two females and three of unknown sex. Three of the 11 mountain lion individuals were identified multiple times over the study period. These estimates supplement previously recorded information on mountain lions in an area where mountain lions were historically considered only transient. We demonstrate that non-invasive genetic techniques, when used in conjunction with camera-trap and radio-collaring methods, can provide additional and reliable information to wildlife managers, particularly on secretive species like the mountain lion.

Diet Composition – Mountain Lions



What Questions can we answer with genetics?



Dispersal / Migration

Source of invasions / colonisation routes

Hybridisation / introgression

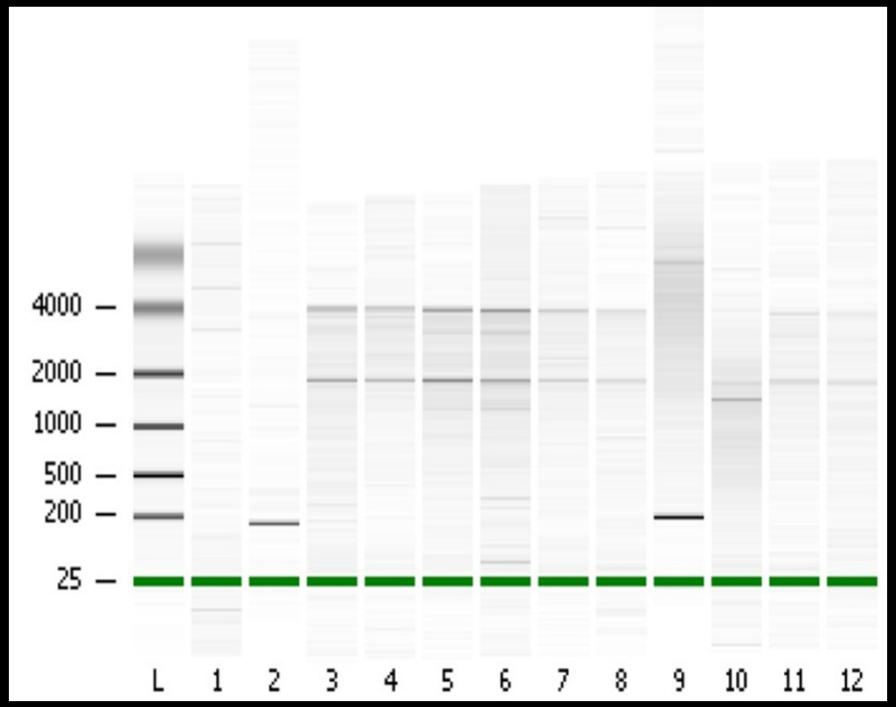
Parentage / Mating

Level of diversity

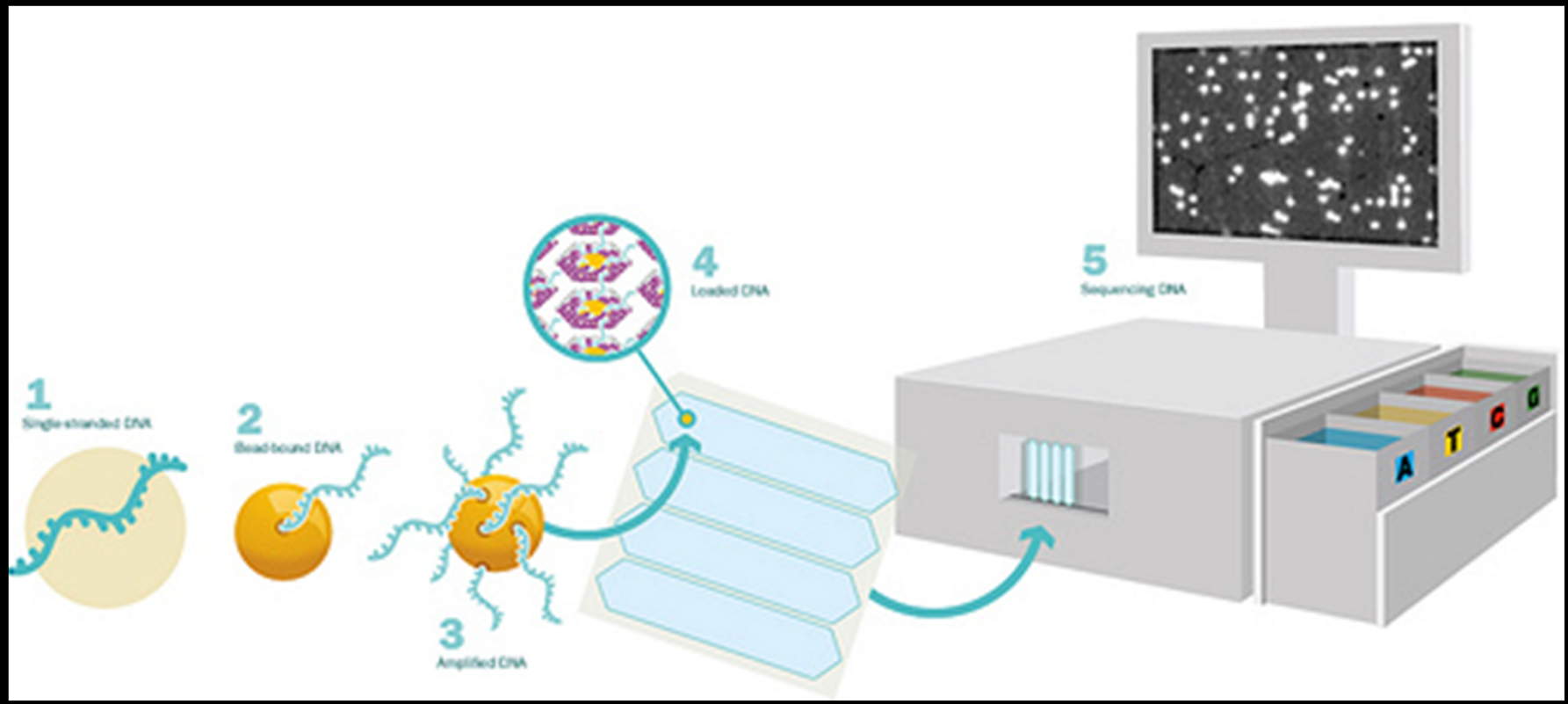
Impact of habitat change

Robert Fitak – PhD Student

Developing "SNPs" Genome-wide Markers for Pumas



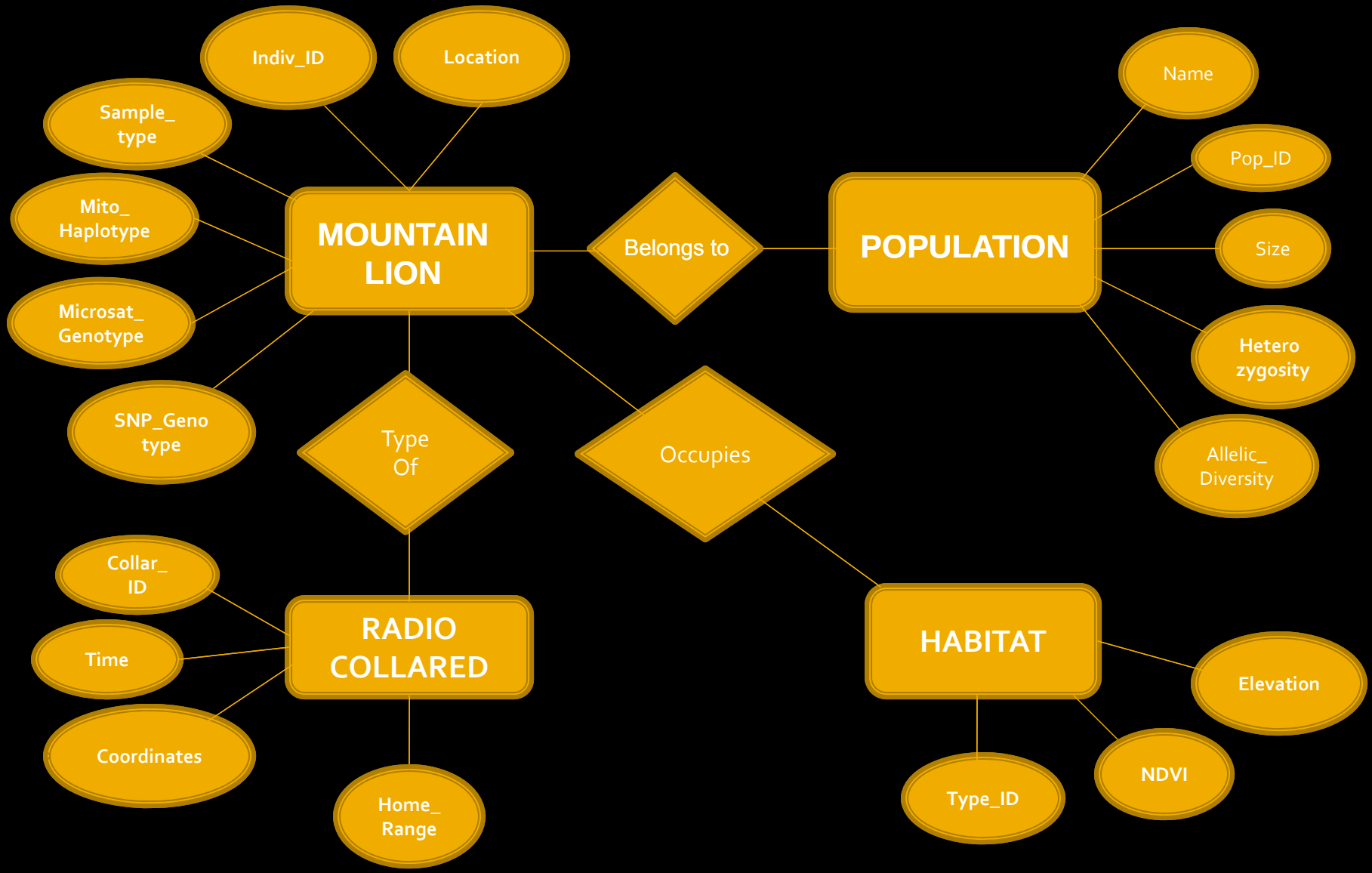
High Resolution Markers for Investigating Population Structure at the Genomic Scale



Use of genome-level SNP markers

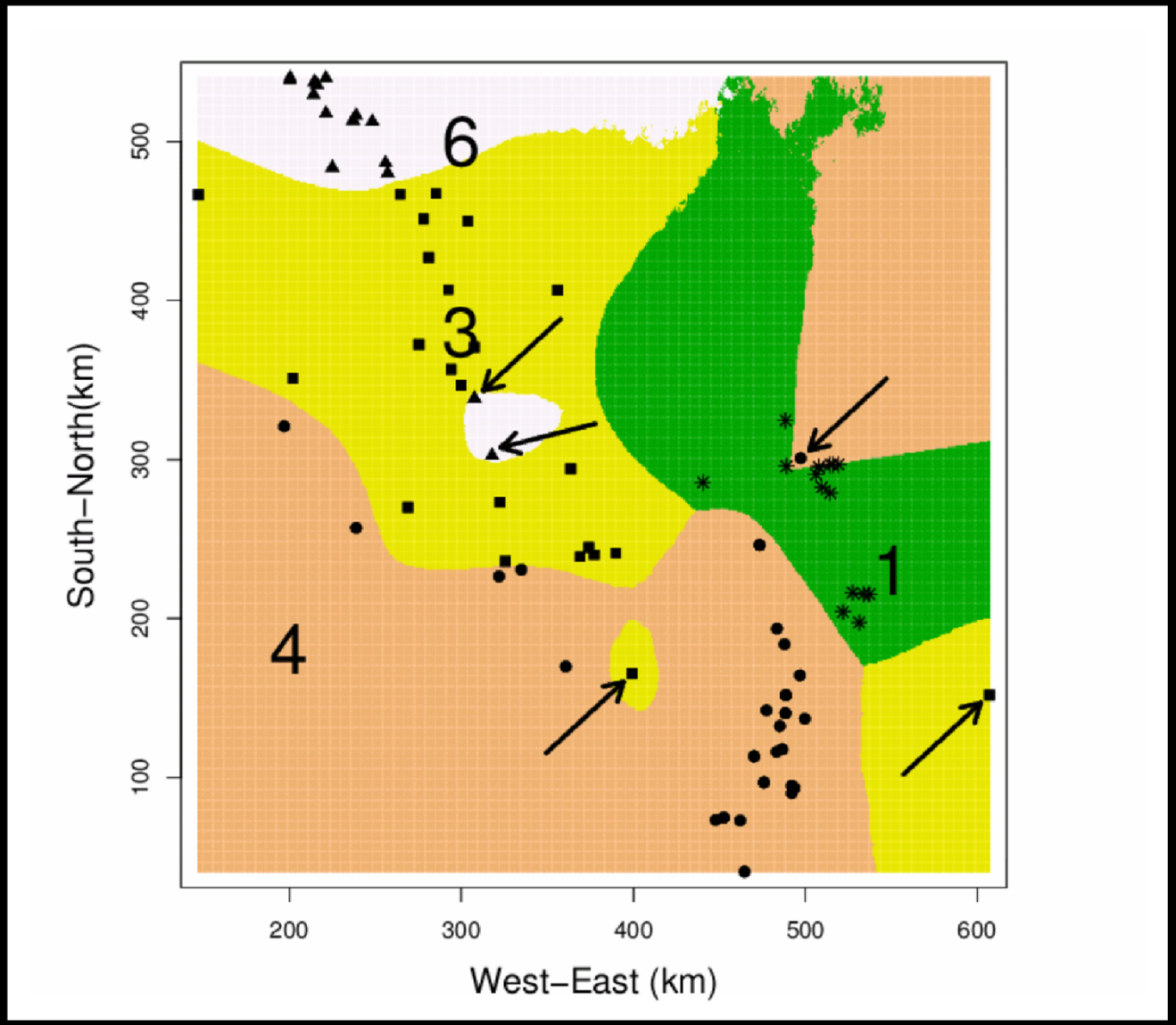
- Design a panel of markers specific to Southwest mountain lion populations
- Detail population genetic structure in AZ
  - Identify source of mountain lions on Kofa NWR
  - Identify corridors based on genetic data
  - Forensics application
    - Regional mountain lion genetic database
- Revisit the recolonization history of mountain lions into North America (higher-resolution)

Regional Mountain Lion Genetic Database

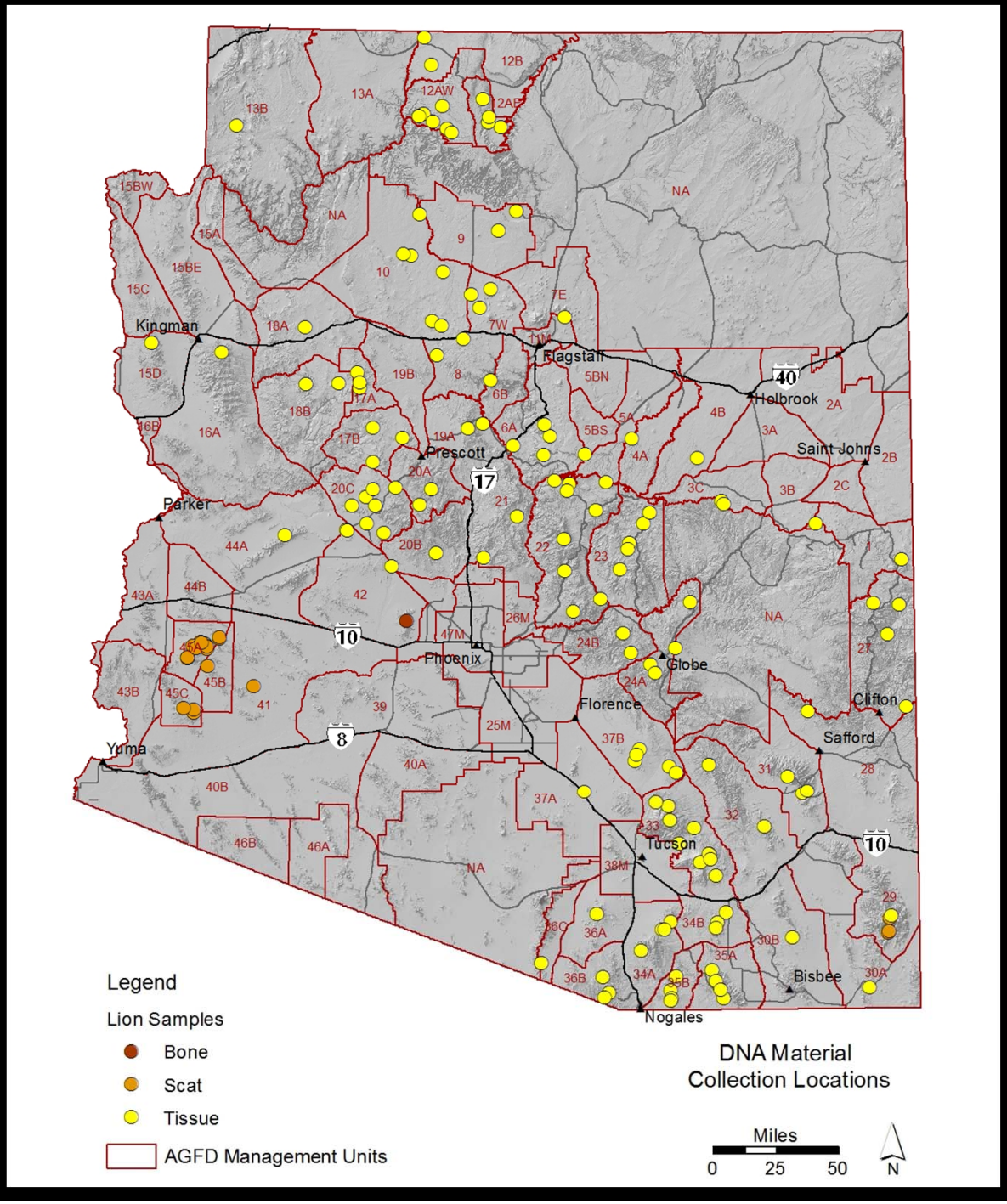


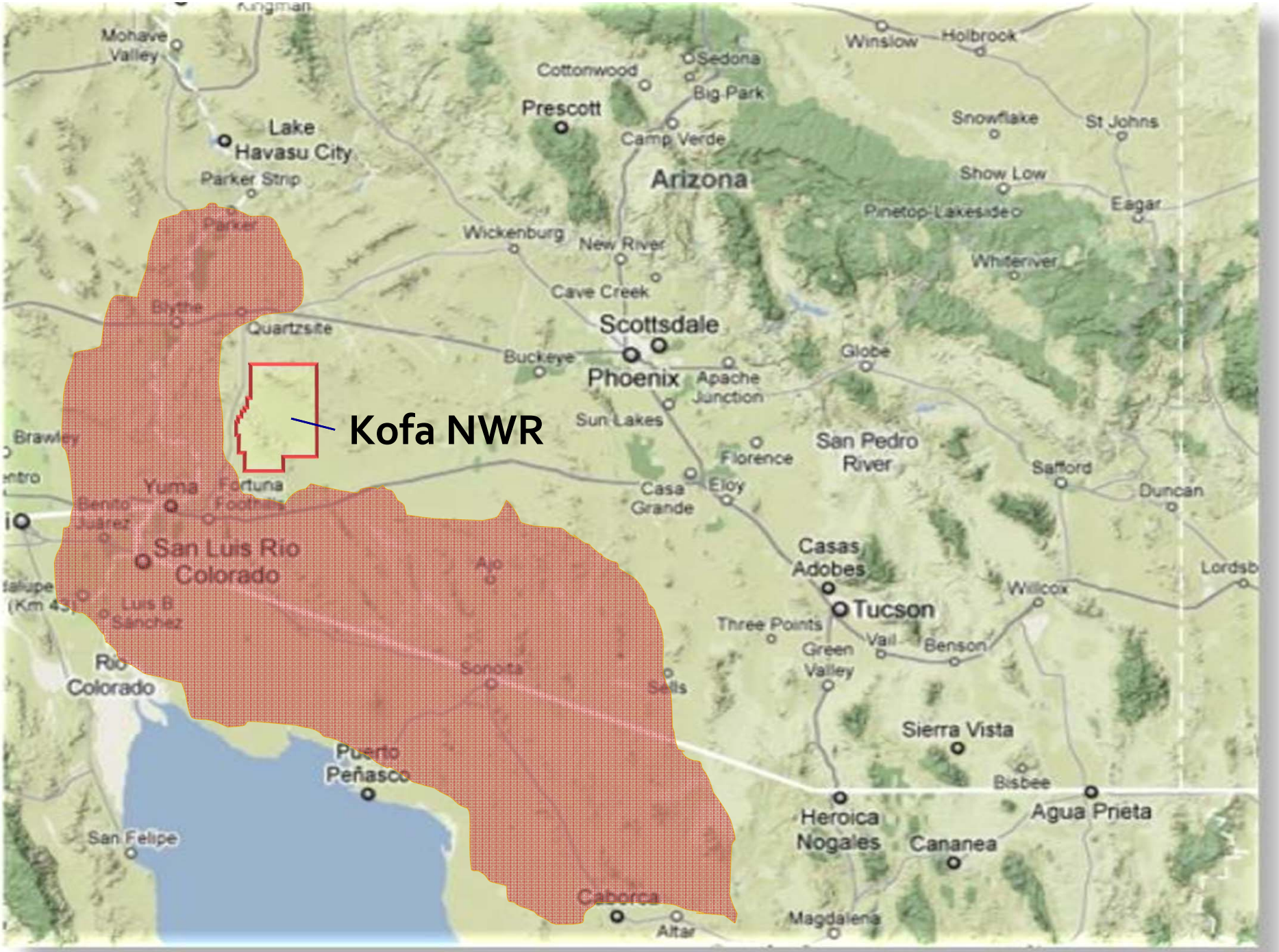
SNP Genotypes and a Regional Database Can Help

Assignment of Individuals to Source Populations



Source Population Identification




Kofa NWR
Mohave Valley
Lake Havasu City
Parker Strip
Parker
Blythe
Quartzsite
Brawley
Yuma
Fortuna Foothills
Bento Juarez
San Luis Rio Colorado
Luis B Sanchez
Rio Colorado
Puerto Peñasco
San Felipe
Cottonwood
Sedona
Big Park
Prescott
Camp Verde
Lake Havasu City
Arizona
Wickenburg
New River
Cave Creek
Scottsdale
Buckeye
Phoenix
Apache Junction
Sun Lakes
Casa Grande
Florence
Eloy
San Pedro River
Winslow
Holbrook
Snowflake
St Johns
Show Low
Pinetop-Lakeside
Eagar
Whiteriver
Globe
Safford
Duncan
Casas Adobes
Tucson
Willcox
Three Points
Vail
Benson
Green Valley
Sierra Vista
Bisbee
Agua Prieta
Heroica Nogales
Cananea
Sonoita
Sells
Caborca
Altar
Magdalena
Lordsb

Seeking Mountain Lion samples…

Scat Collection Protocol is Available at www.catsg.org

ashwin@email.arizona.edu

Thank You | Gracias

Desert Bighorn Council

Wild Felid
Research & Management Association

Arizona Desert Bighorn Sheep Society