Public Meeting

Desert Bighorn Sheep and Mountain Lion Biology, Management, and the KOFA

7 August, 2009

Region IV

Meeting Agenda

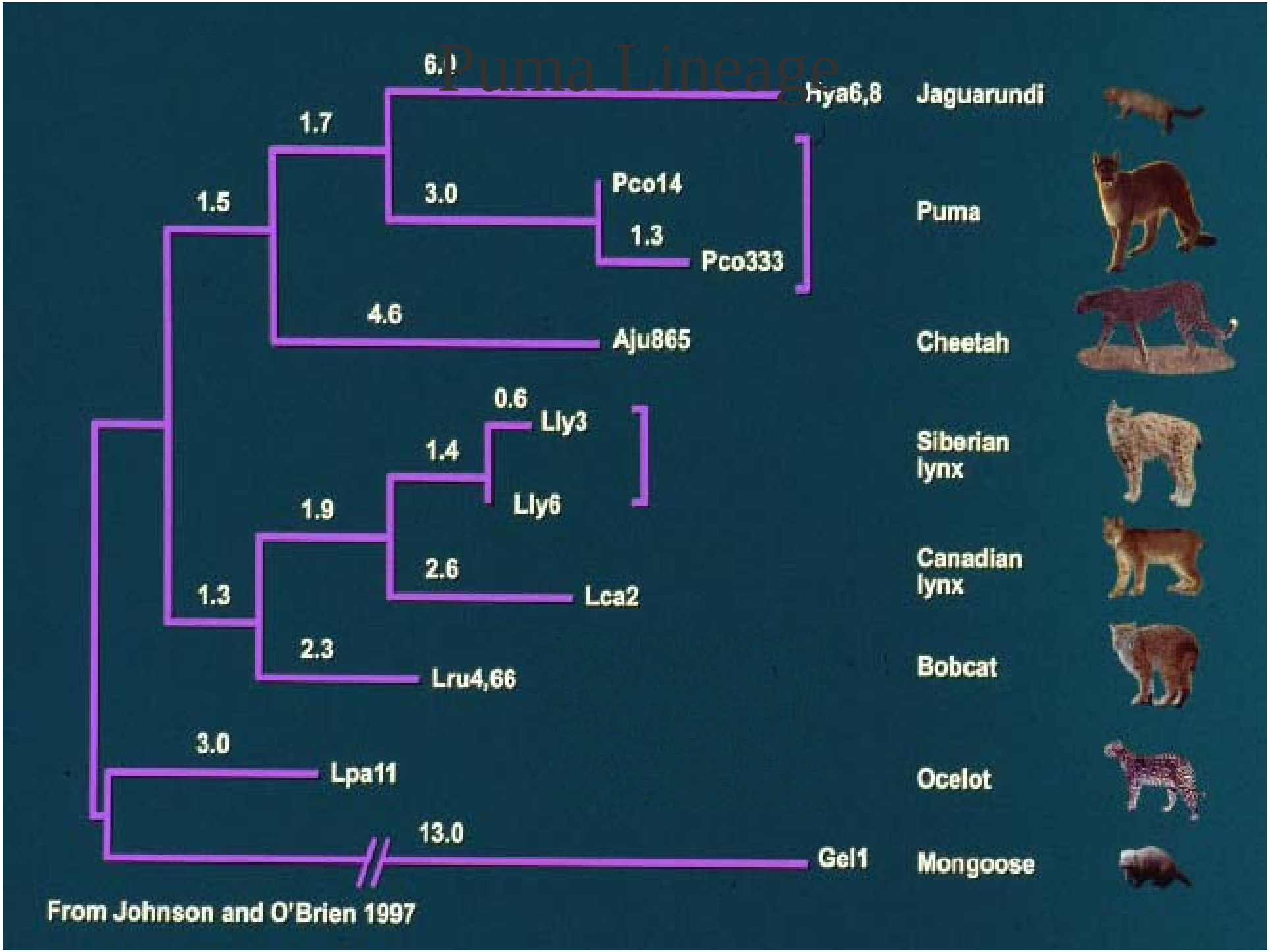
1. Mountain lion biology and management;
   - Ron Thompson, AZGFD Large Carnivore Biologist
2. Desert bighorn sheep biology and management;
   - John Hervert, AZGFD Region IV Wildlife Program Manager
3. Management decisions and biodiversity;
   - Pat Barber, AZGFD Region IV Supervisor
4. Questions and answers;
   - All

Mountain Lion

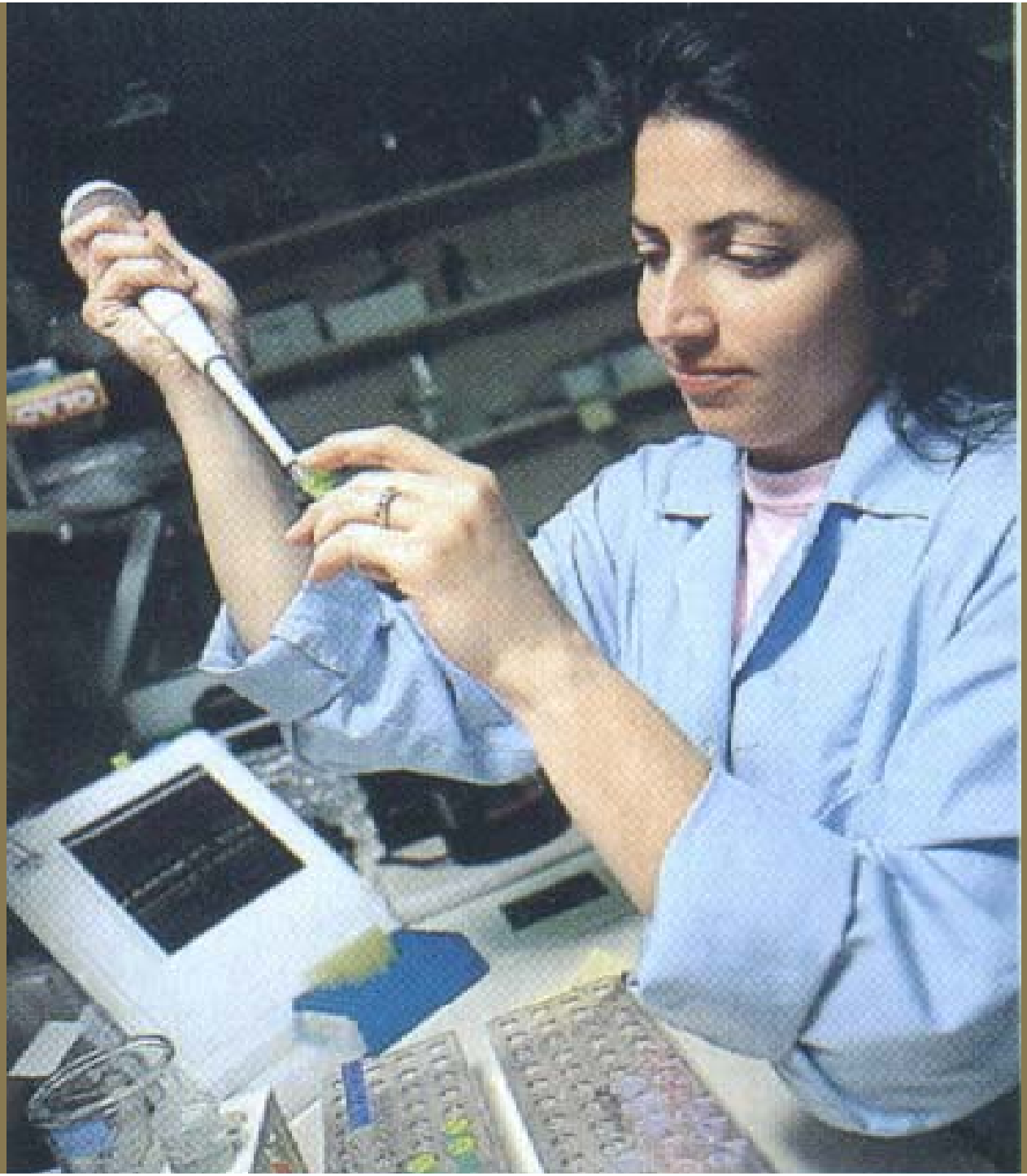
Mountain Lion

- Scientific name: *Puma concolor*
- ***Conservation status*** *Least Concern* (***IUCN - International Union for Conservation of Nature***)

Puma Lineage



From Johnson and O'Brien 1997

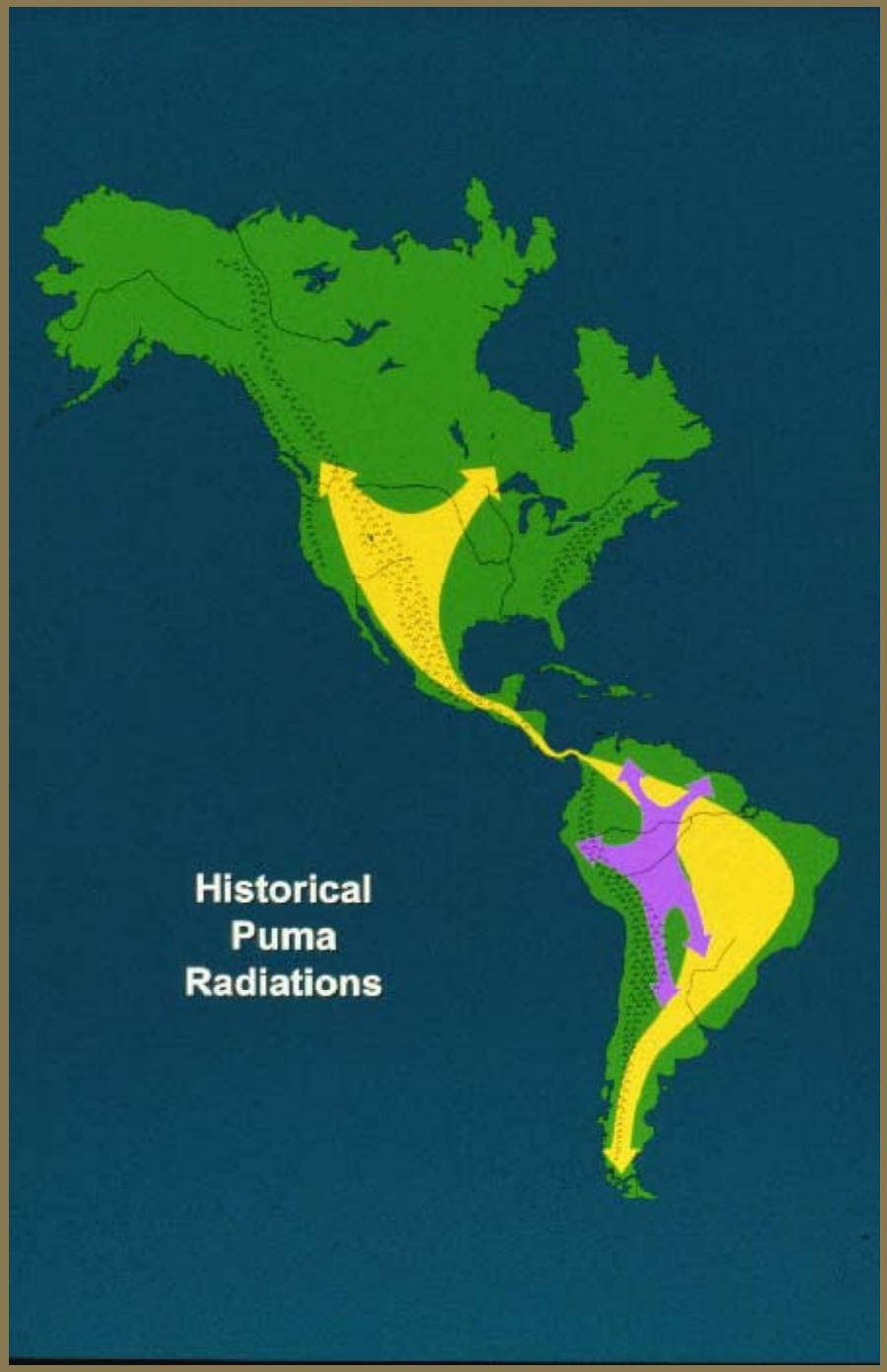


Harcuvar Mtns., La Paz Co., AZ
By Dave Conrad

2 Major historical radiations

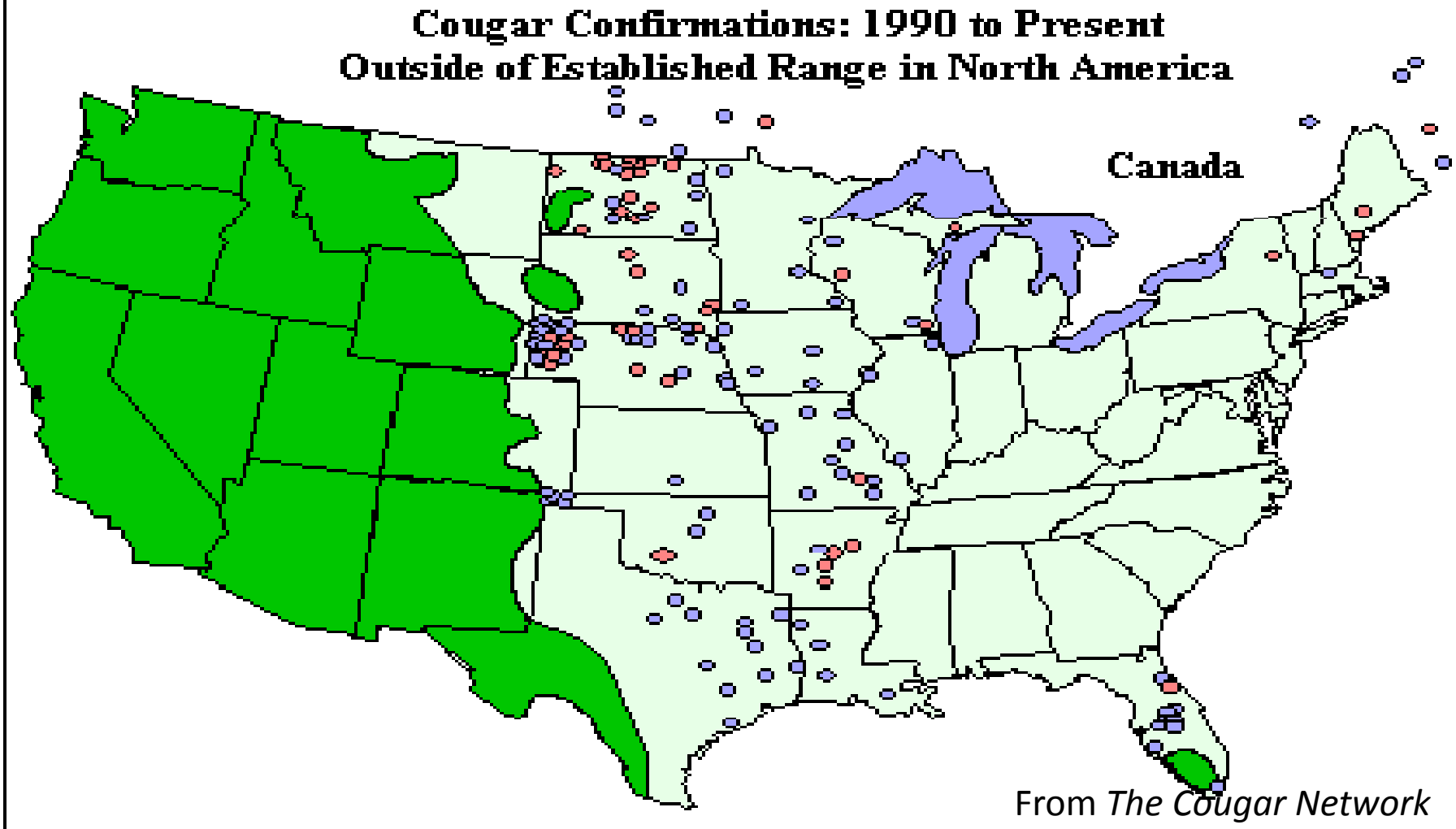
-One locally distributed

-One broad ranging



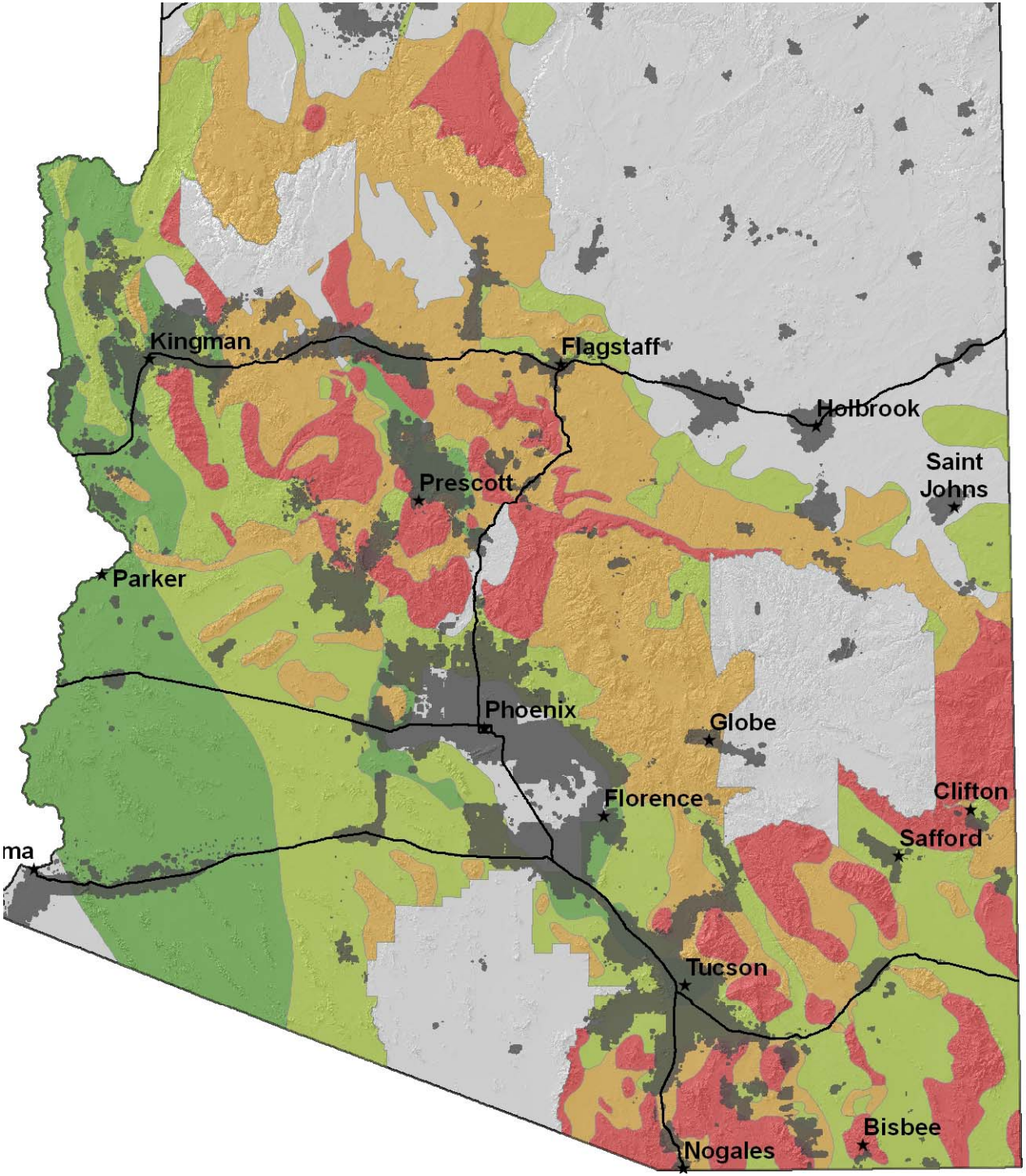
Distribution and Status

Mountain Lions are re-occupying historic range



From *The Cougar Network*

Mountain Lion Distribution with Urban Growth for 2050



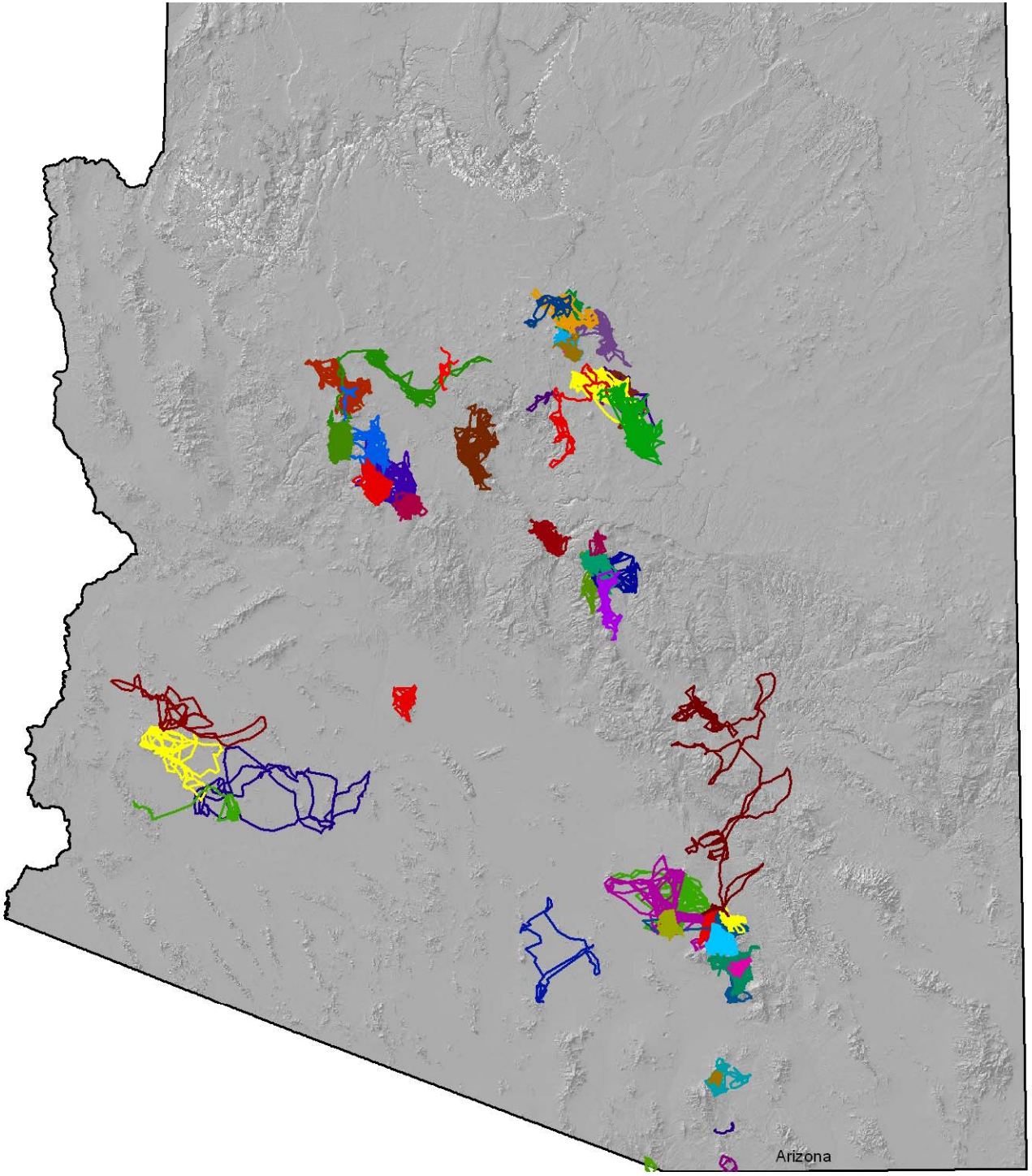
Urban Growth 2050
High (0.05-0.10 lions per sq. mile)
Medium (0.01-0.05 lions per sq. m
Low (0.005-0.01 lions per sq. mile)
Sparse (0-0.005 lions per sq. mile)

N

Kilometers

0 50 100

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



Movements from GPS Collared Lions

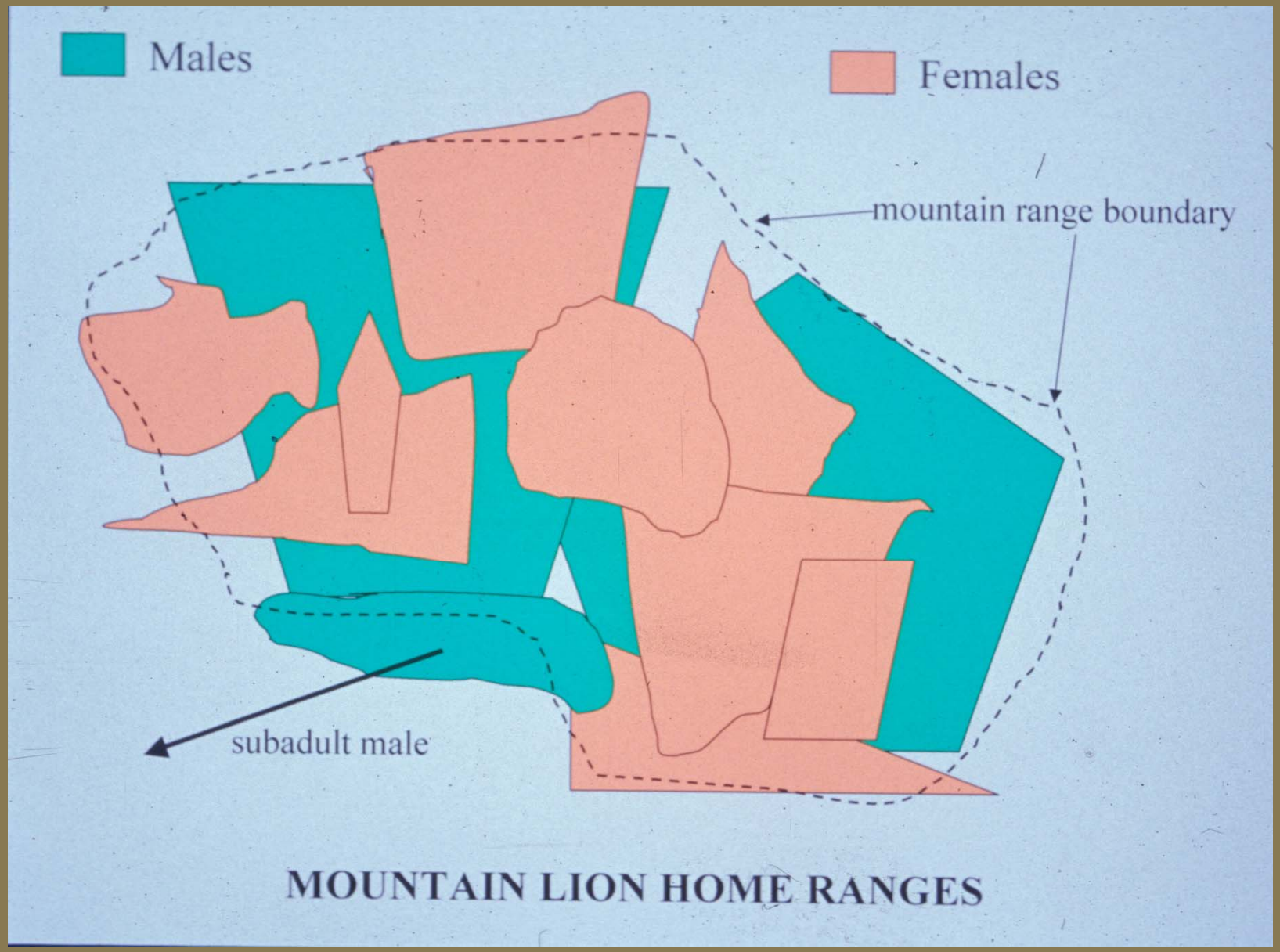
Lines indicate movements of individual animals. Data collected from 8/2005 - 12/200

N

Kilometers

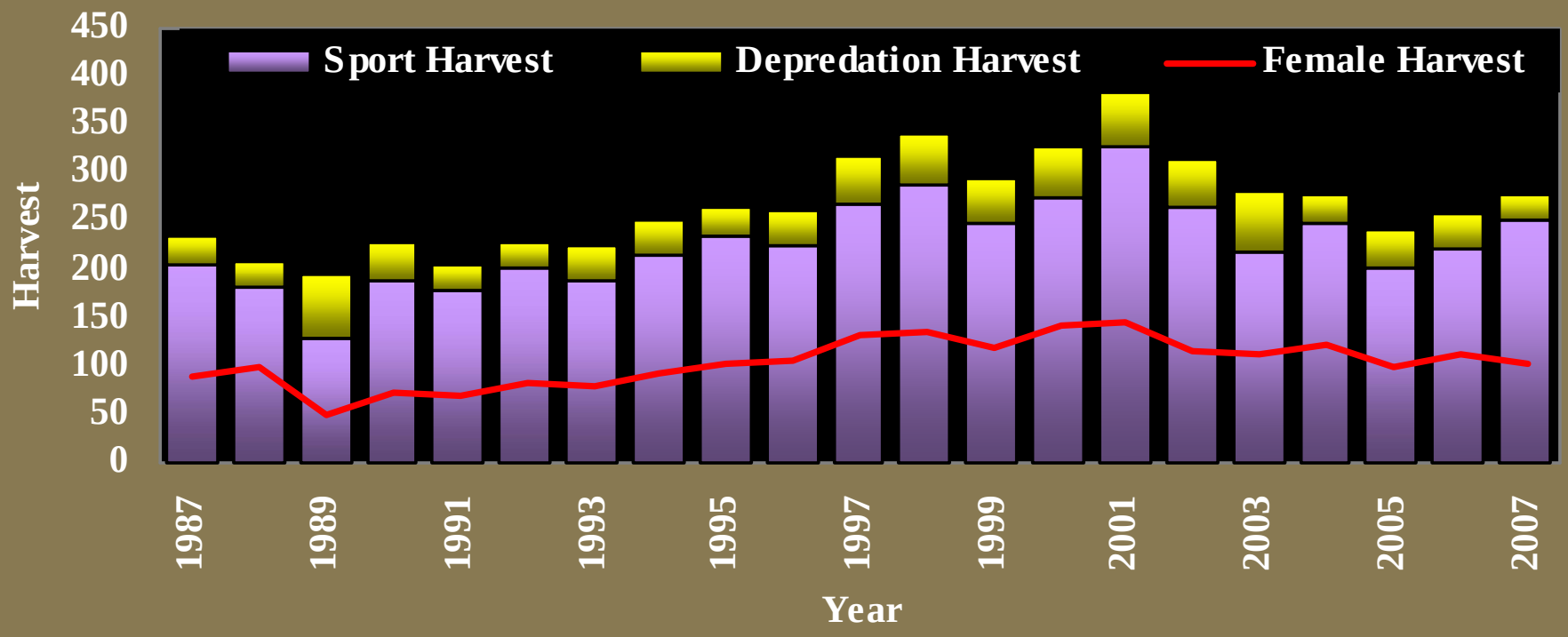
0 50 100

Data Sources:



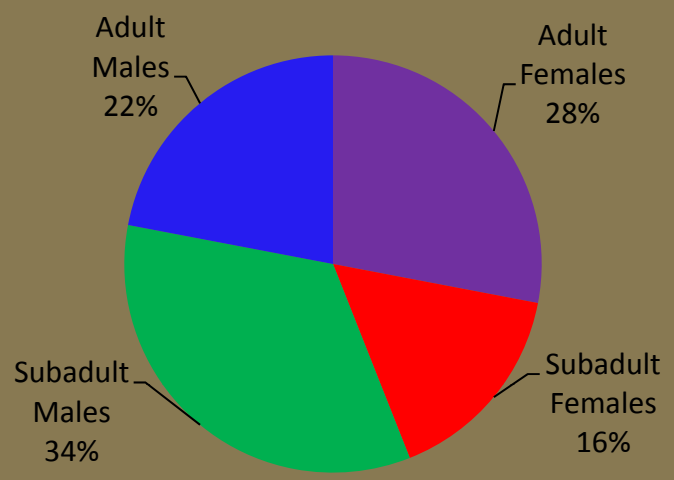
MOUNTAIN LION HOME RANGES

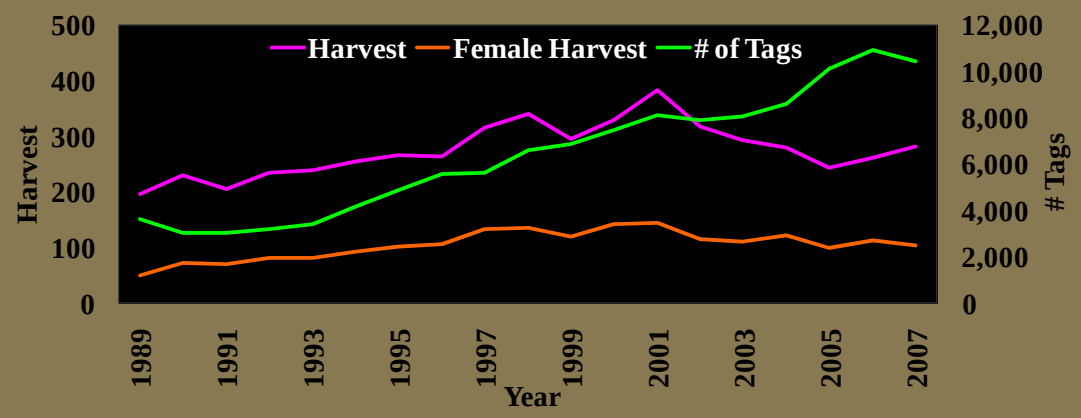
Mountain Lions Killed for Livestock Depredation



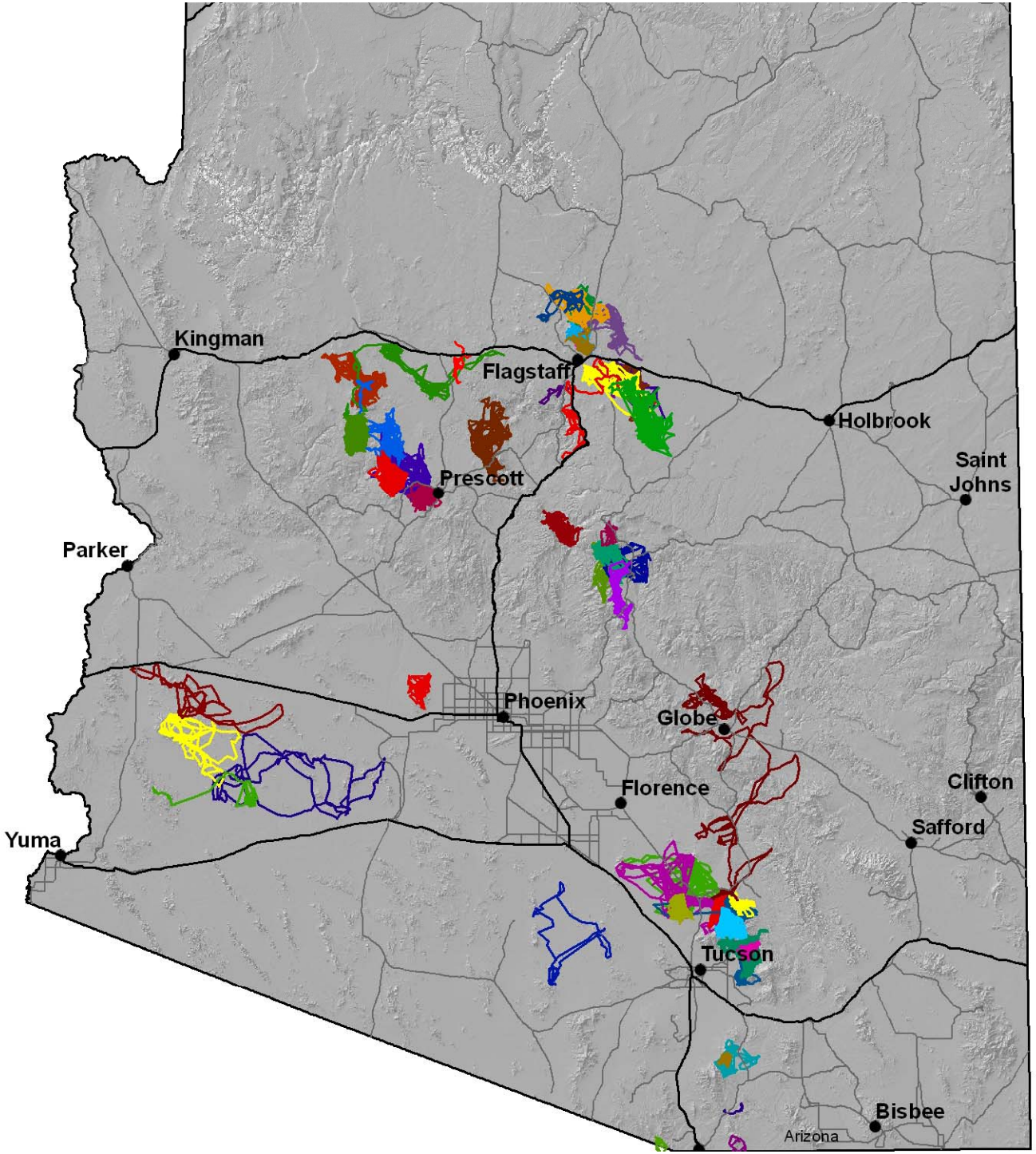
Statewide

Lion Management





- All indicators show healthy robust populations in Arizona and across the west – mountain lions are not rare or endangered
- Arizona refining management (age data, mandatory reporting, female and kitten protection)
- Continue making efforts to improve management



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0 50 100

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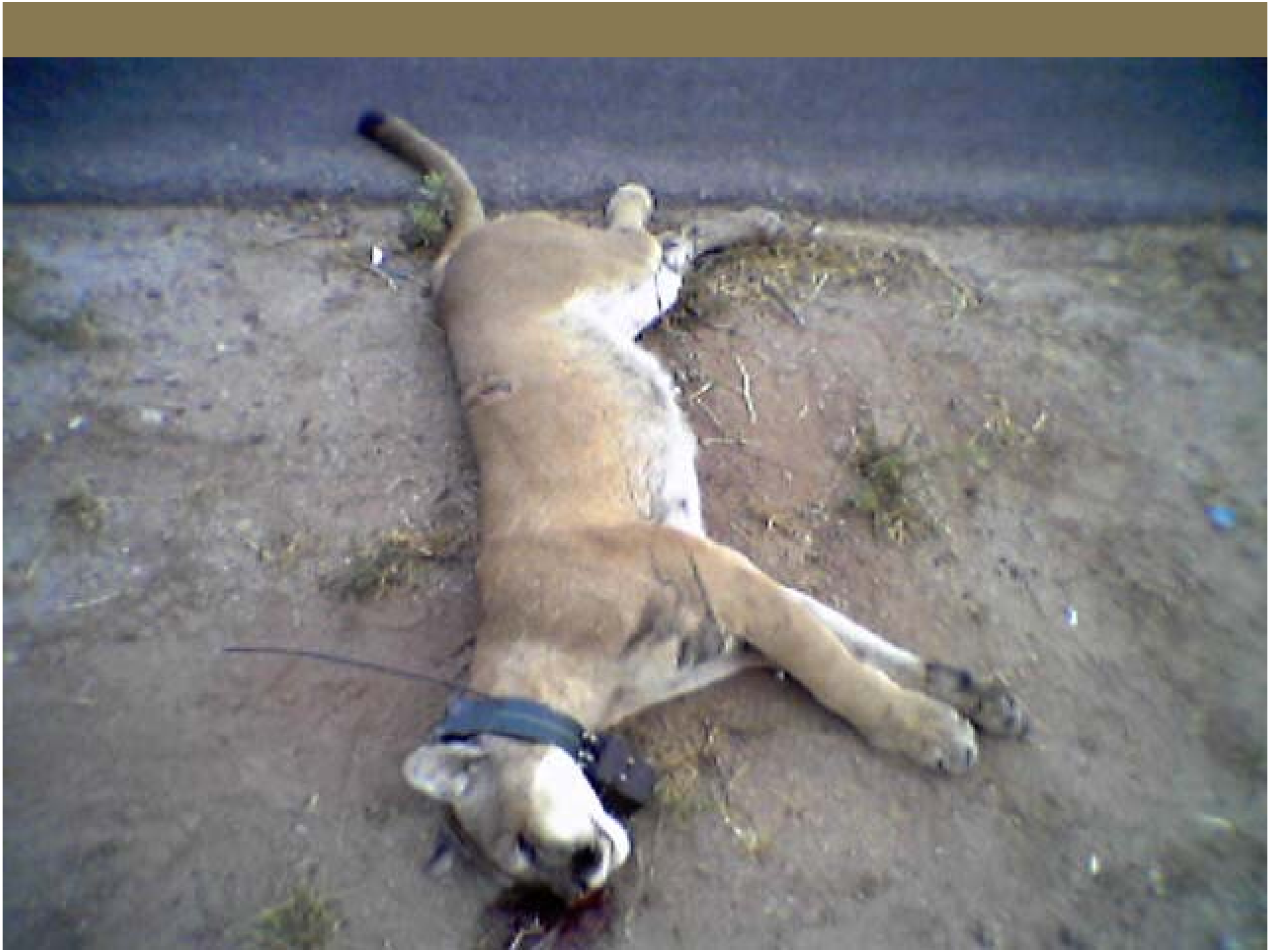
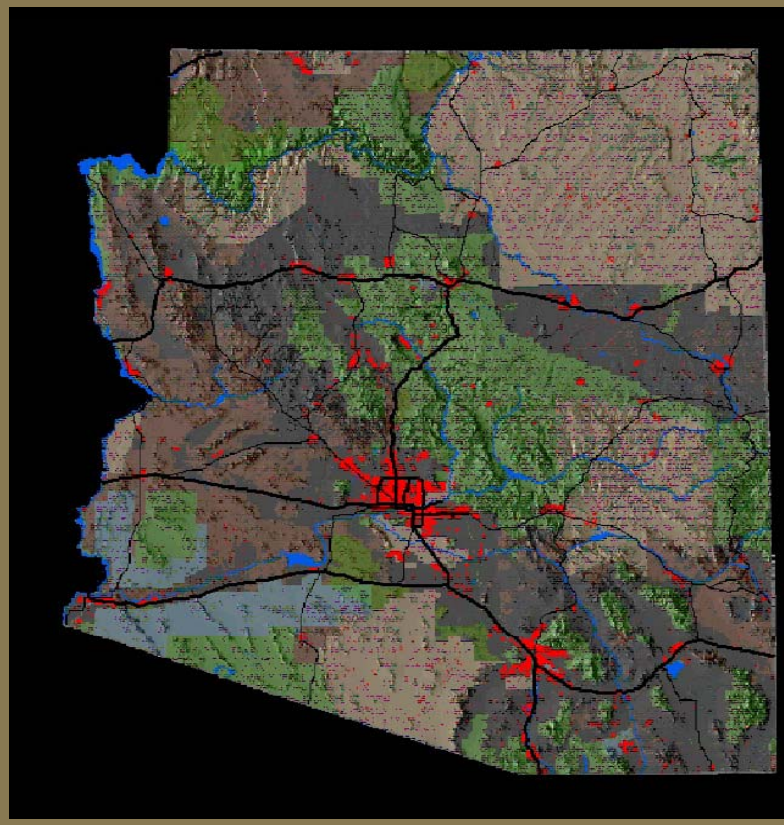
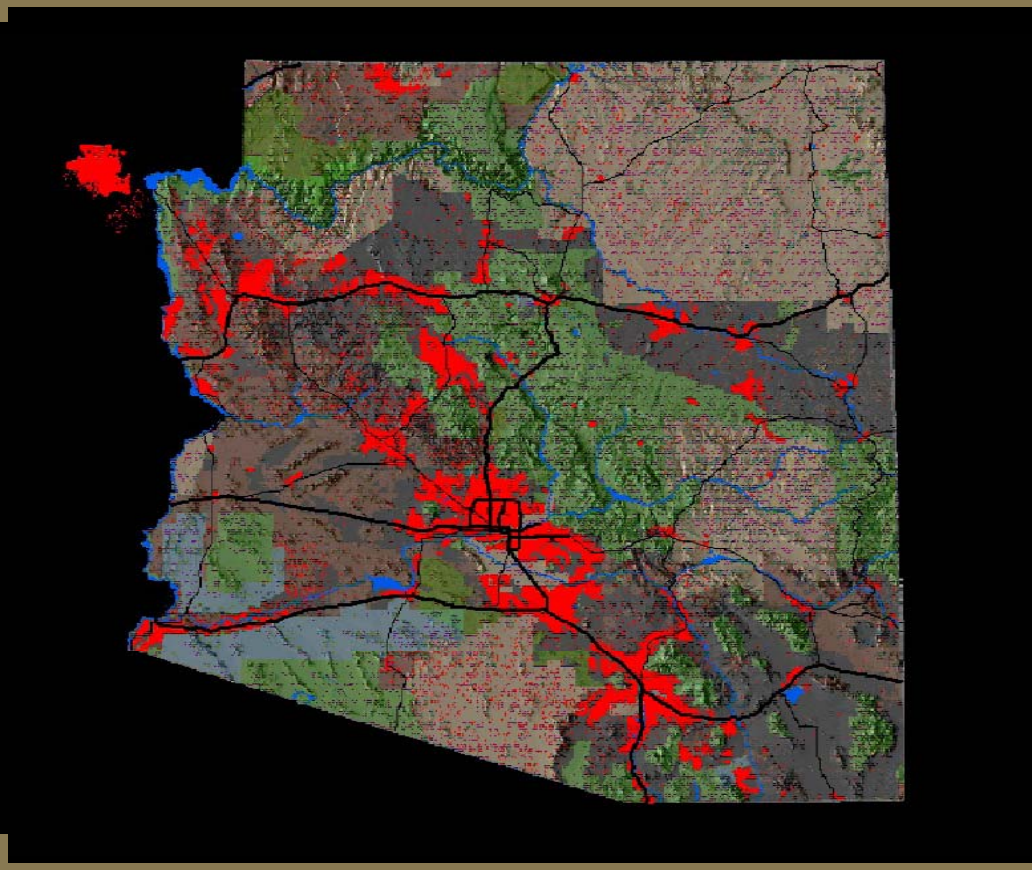


Projected Population Growth 2007-2050





Acceptable Behavior?

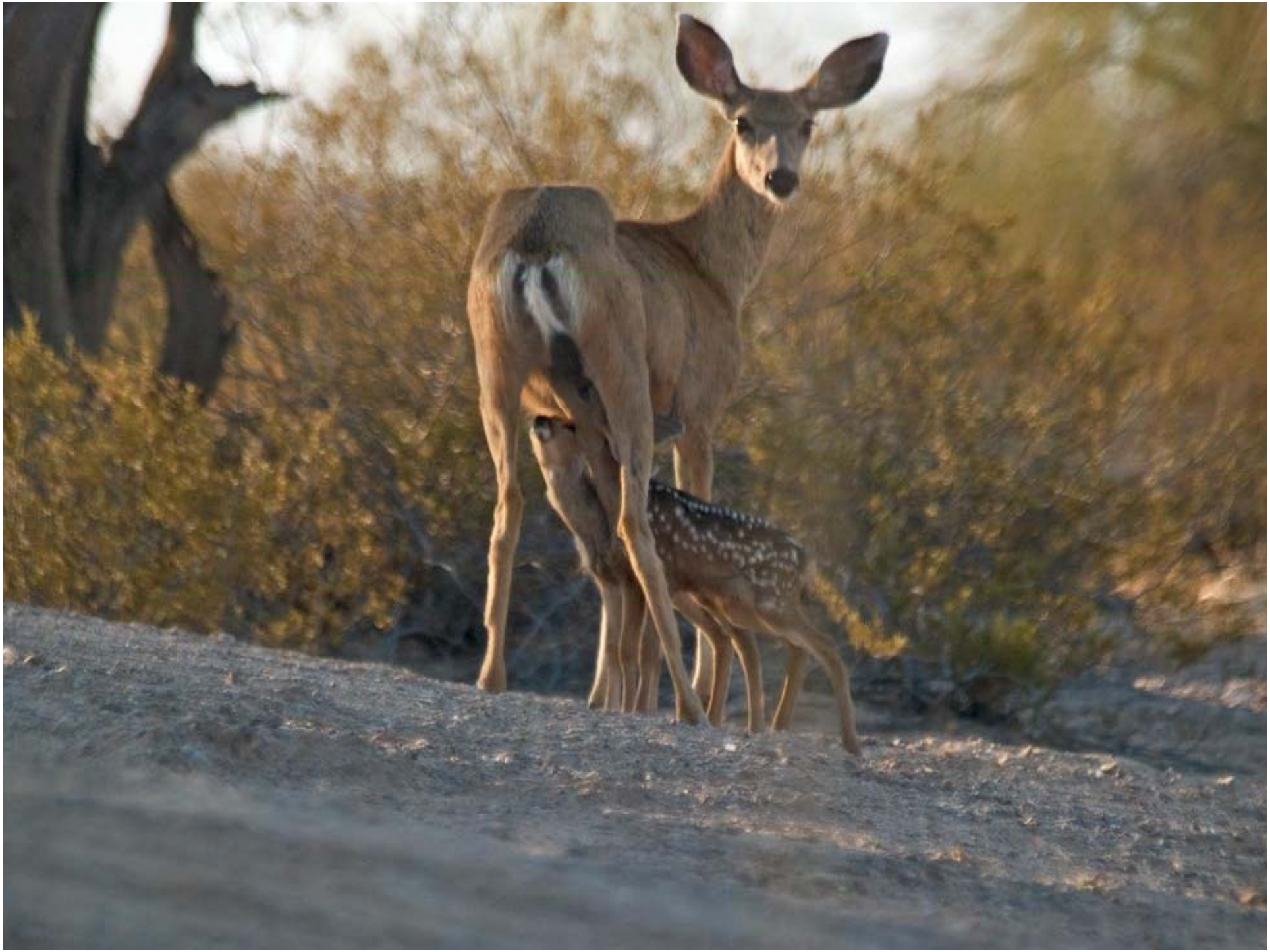
Or

Unacceptable Behavior?

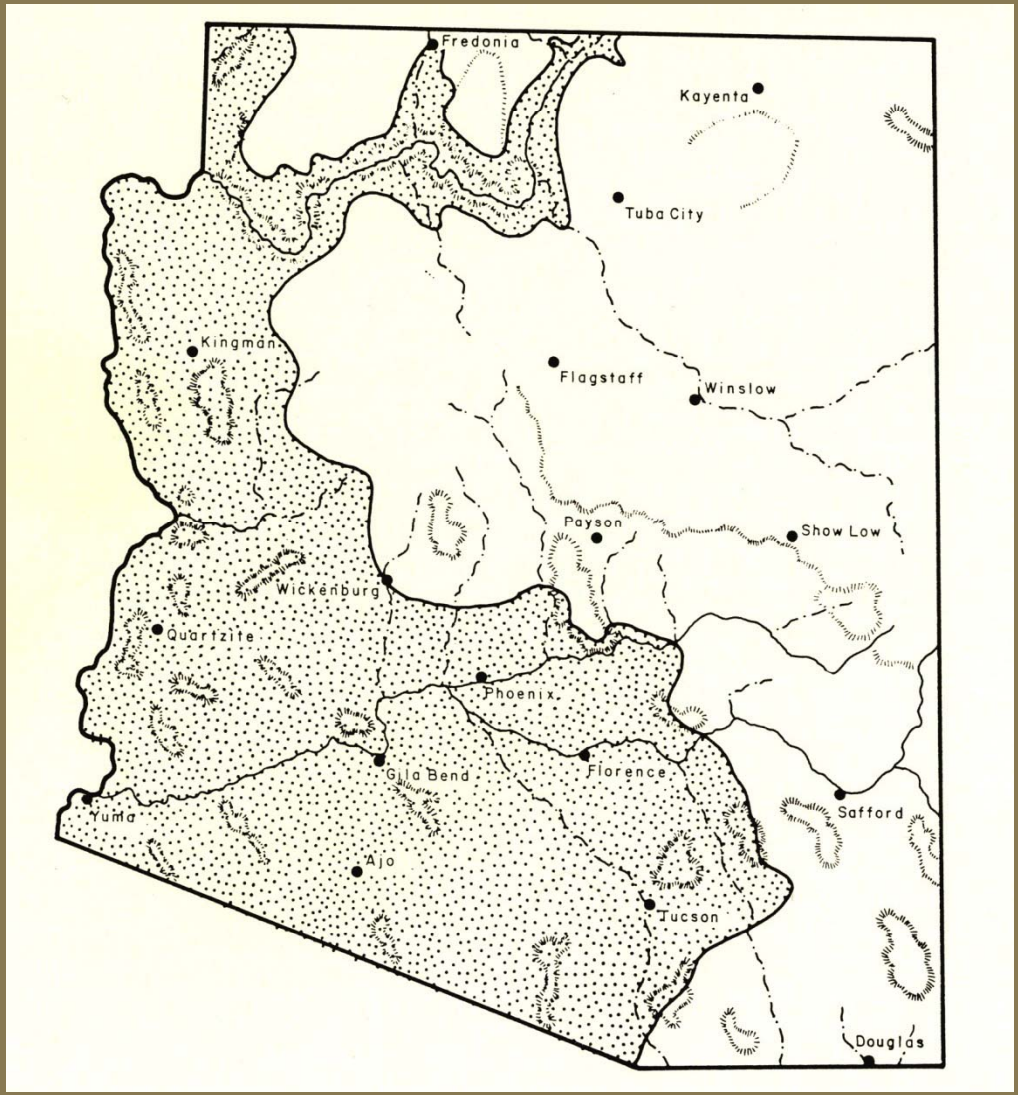
Slide credits

- Brian Jansen
- Lisa Haynes
- Lindsay Smyth
- Homeland Security
- Martin Guerena
- David Baker
- Hans Konig
- Dave Conrad
- George Andrejko
- Melanie Culver

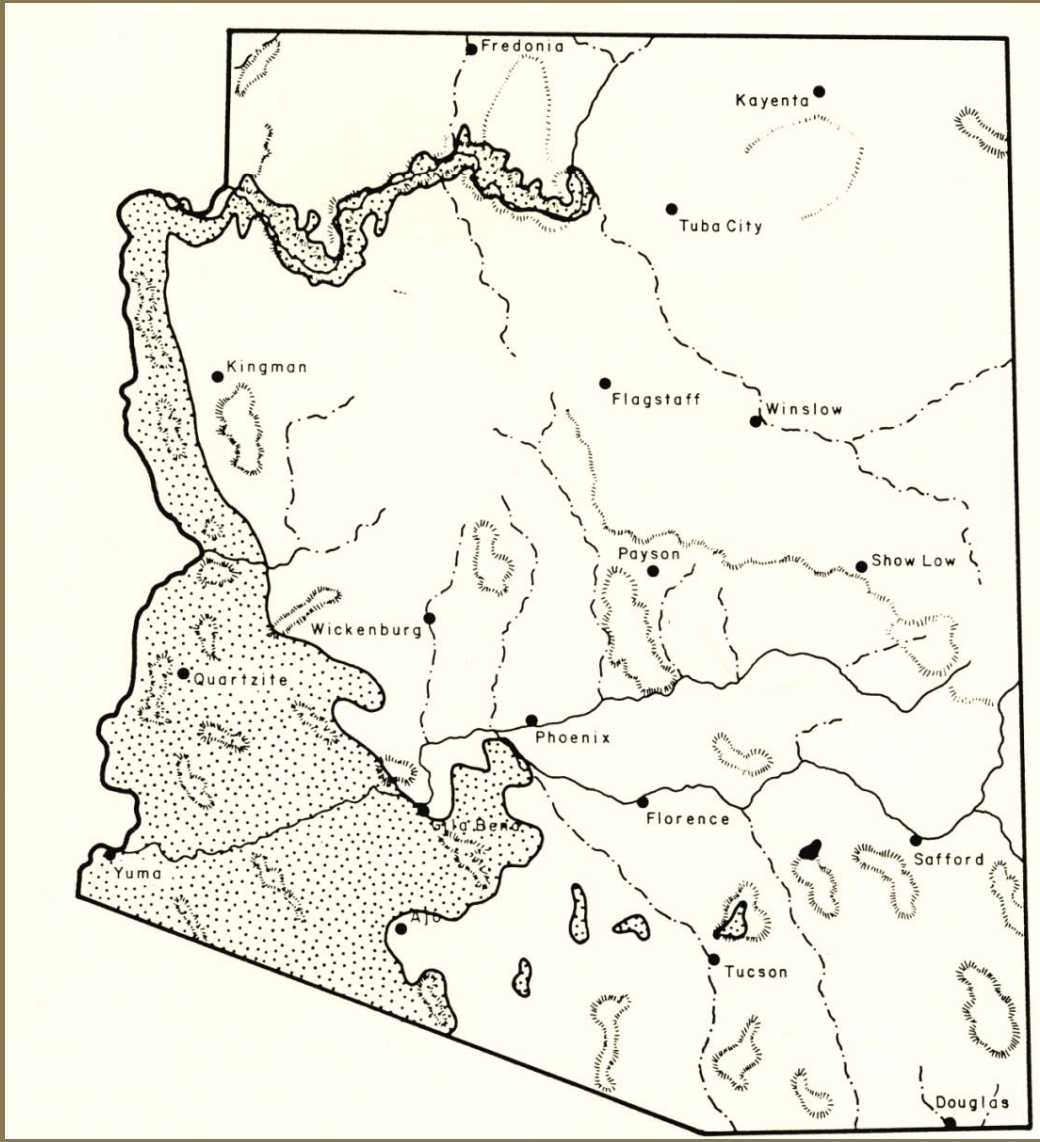
Desert Bighorn Ecology



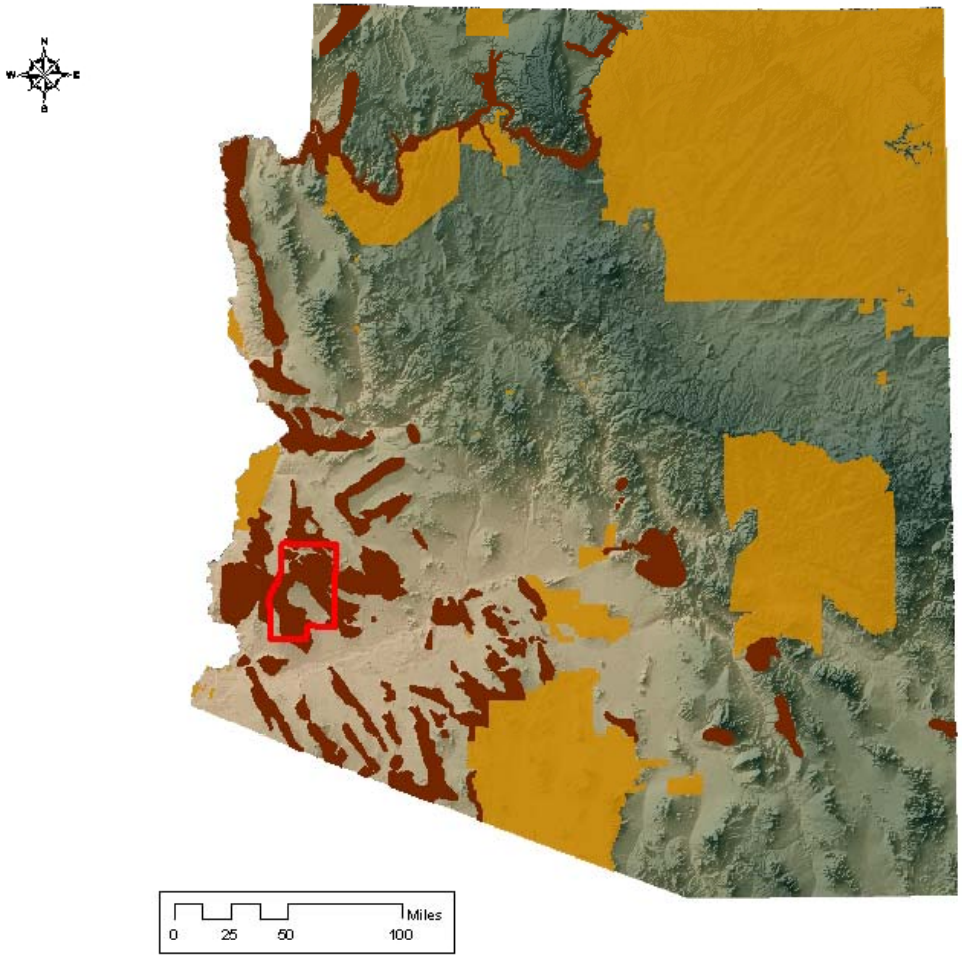
Bighorn Sheep Distribution 1900



Bighorn Sheep Distribution 1960



Current Bighorn Sheep Distribution



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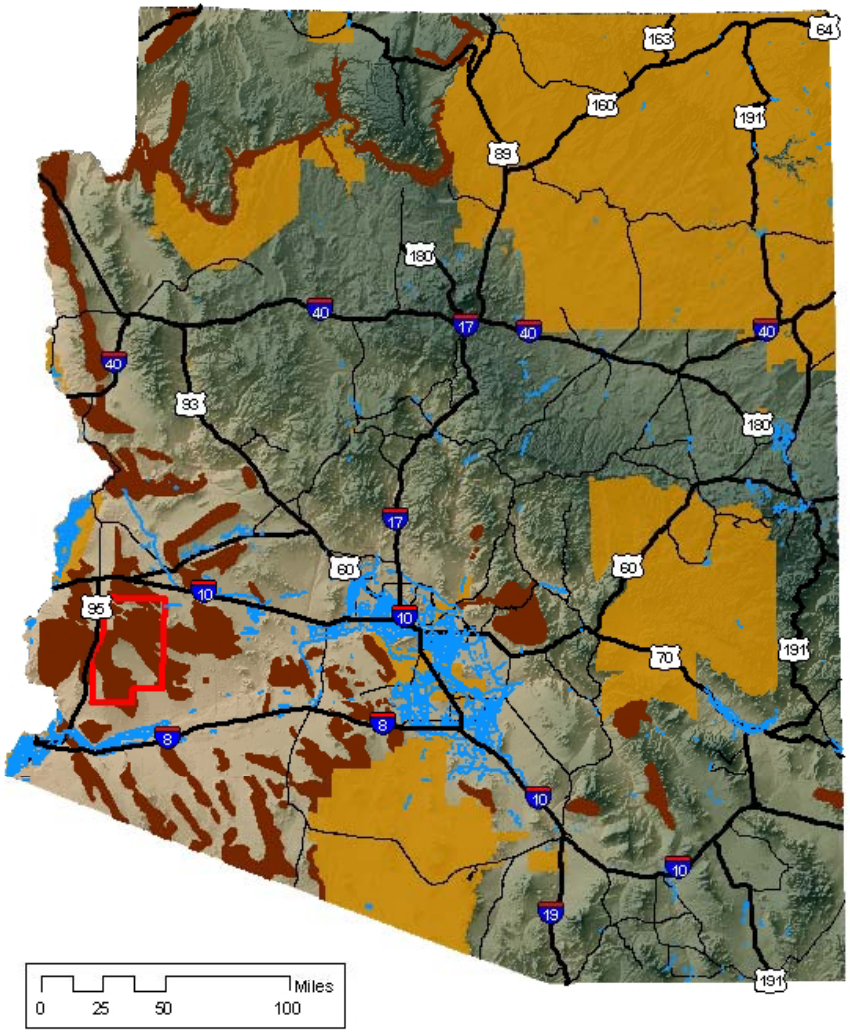
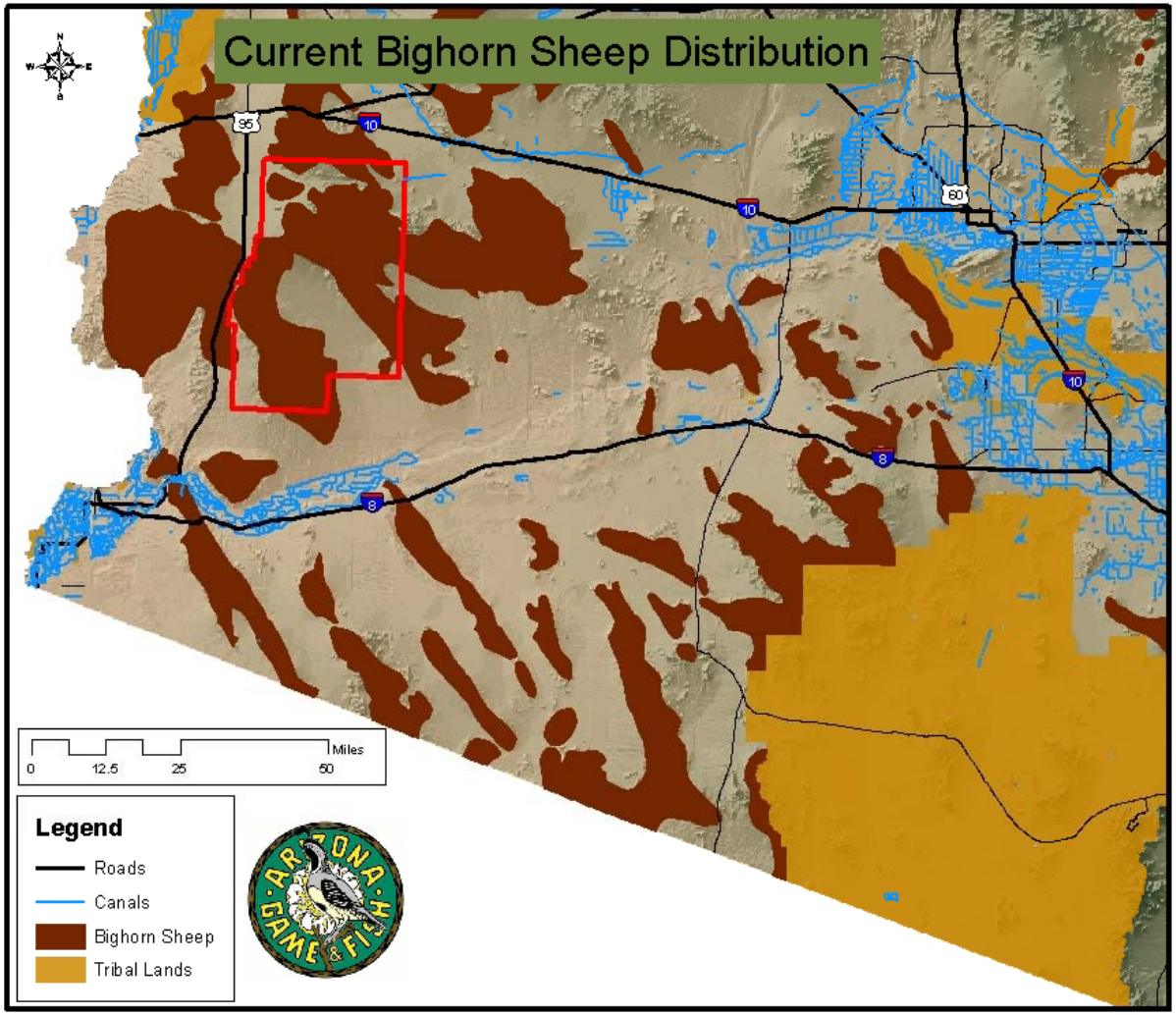


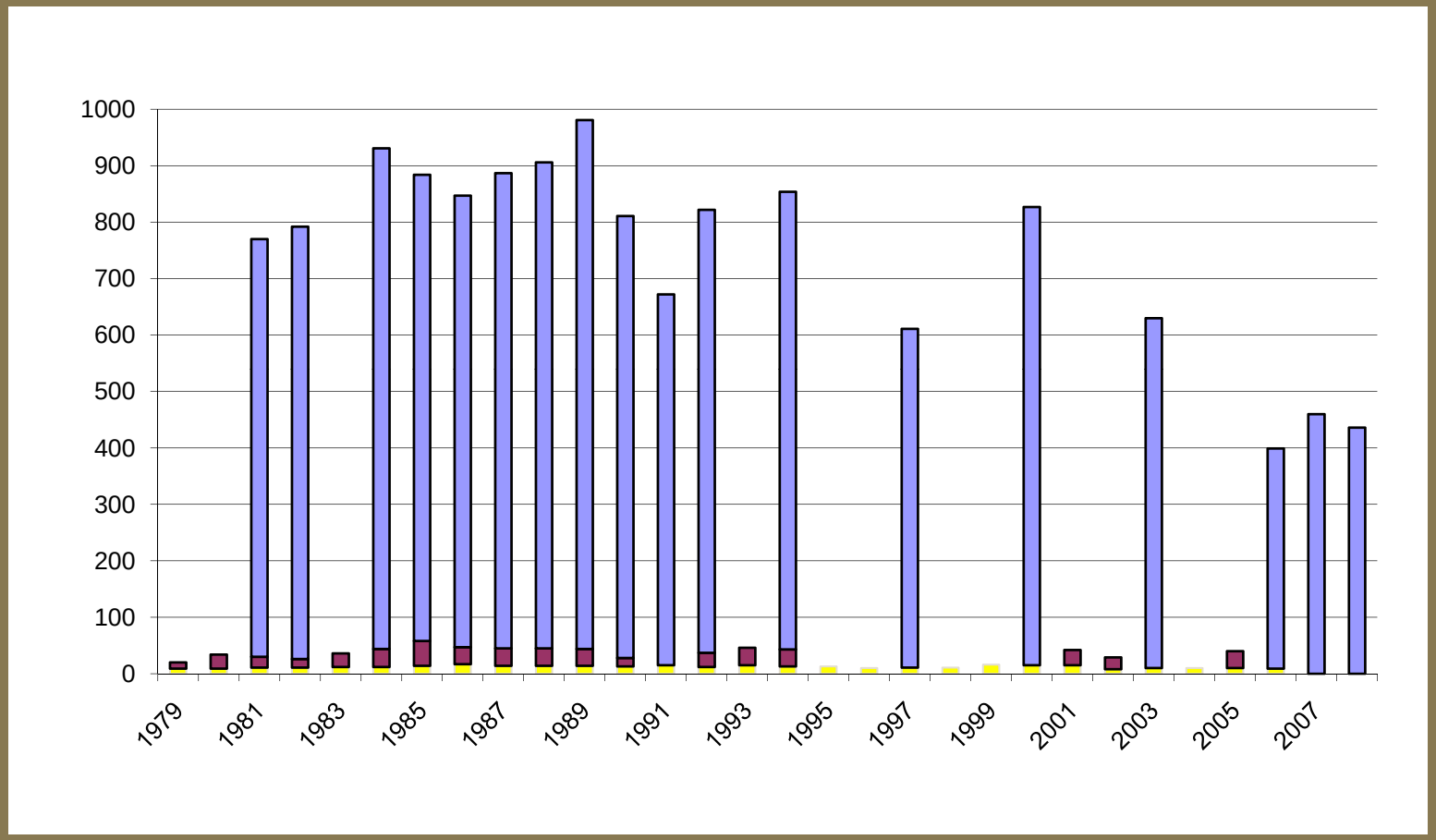
Legend

- Roads
- Canals
- Bighorn Sheep
- Tribal Lands


Current Bighorn Sheep Distribution
95
10
10
80
10
8
8
0
12.5
25
50
Miles
Legend
Roads
Canals
Bighorn Sheep
Tribal Lands
ARIZONA GAME & FISH

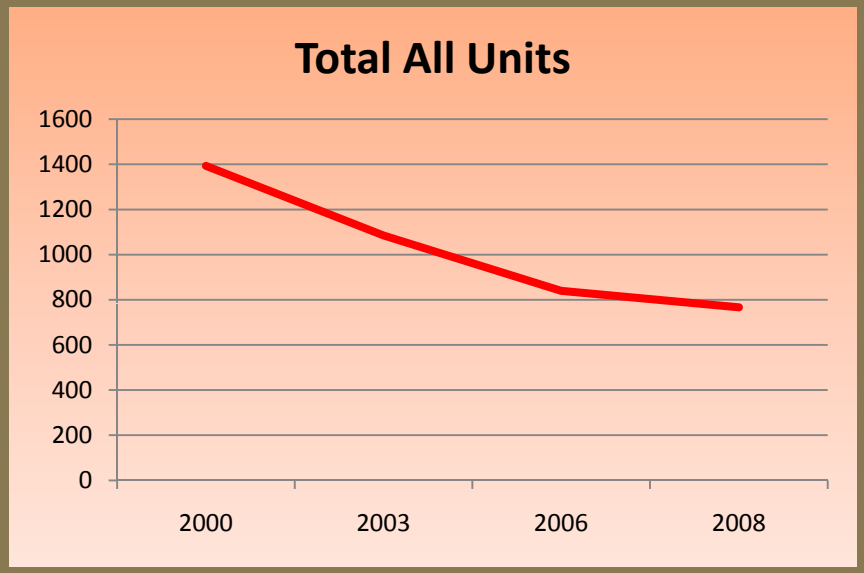
Population Estimation

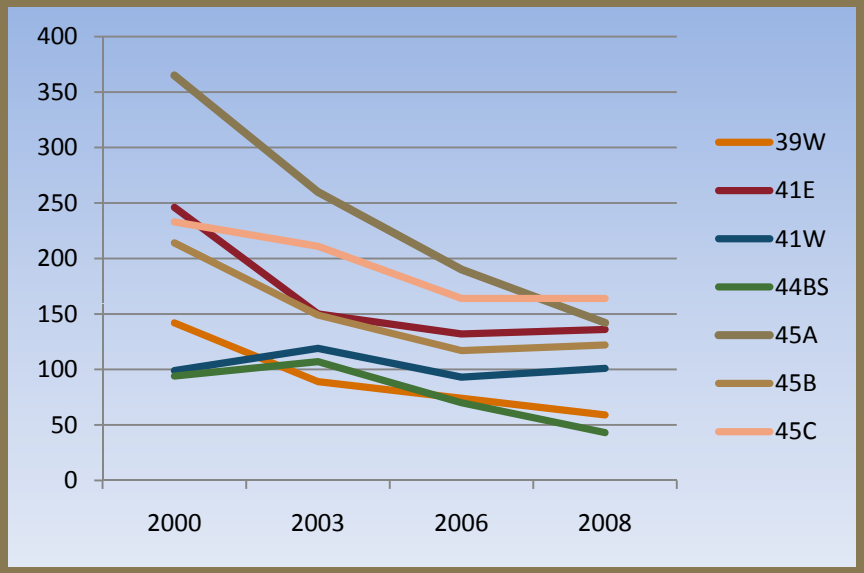
GMU 45: BHS Transplanted and Harvested



Population estimate
bighorn transplanted
rams harvested

Meta-population Trends



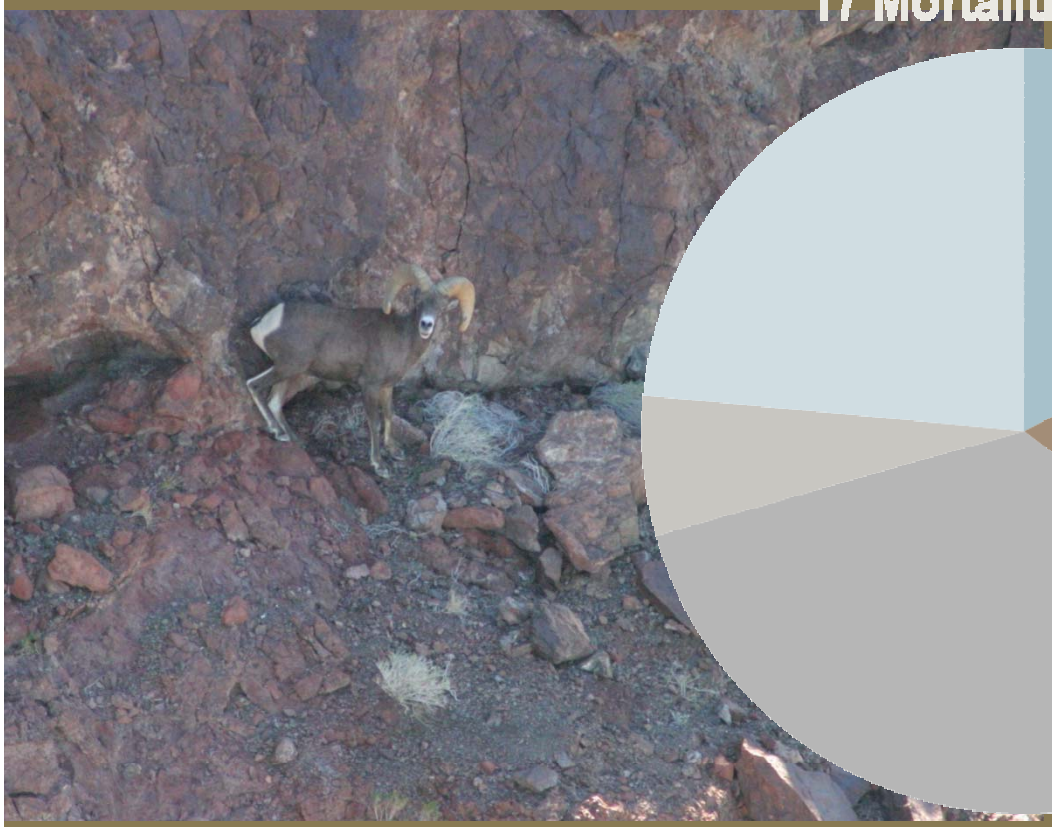


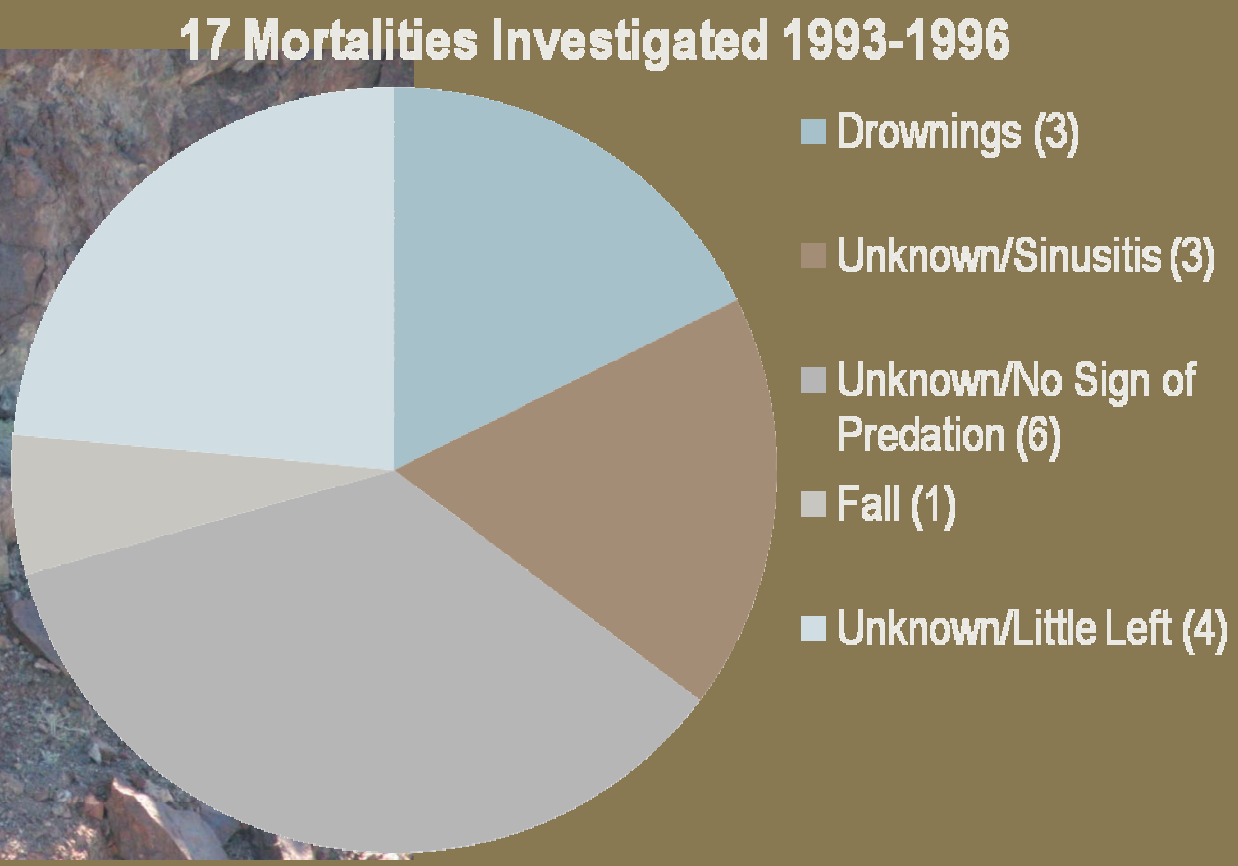
- 49% decline from 2000 to 2008
- Total number declined, Kofa units are the core of this population and account for a large part of the decline
- But there has been a decline across all these units since 2000

What could explain the decline? What could reverse the decline?

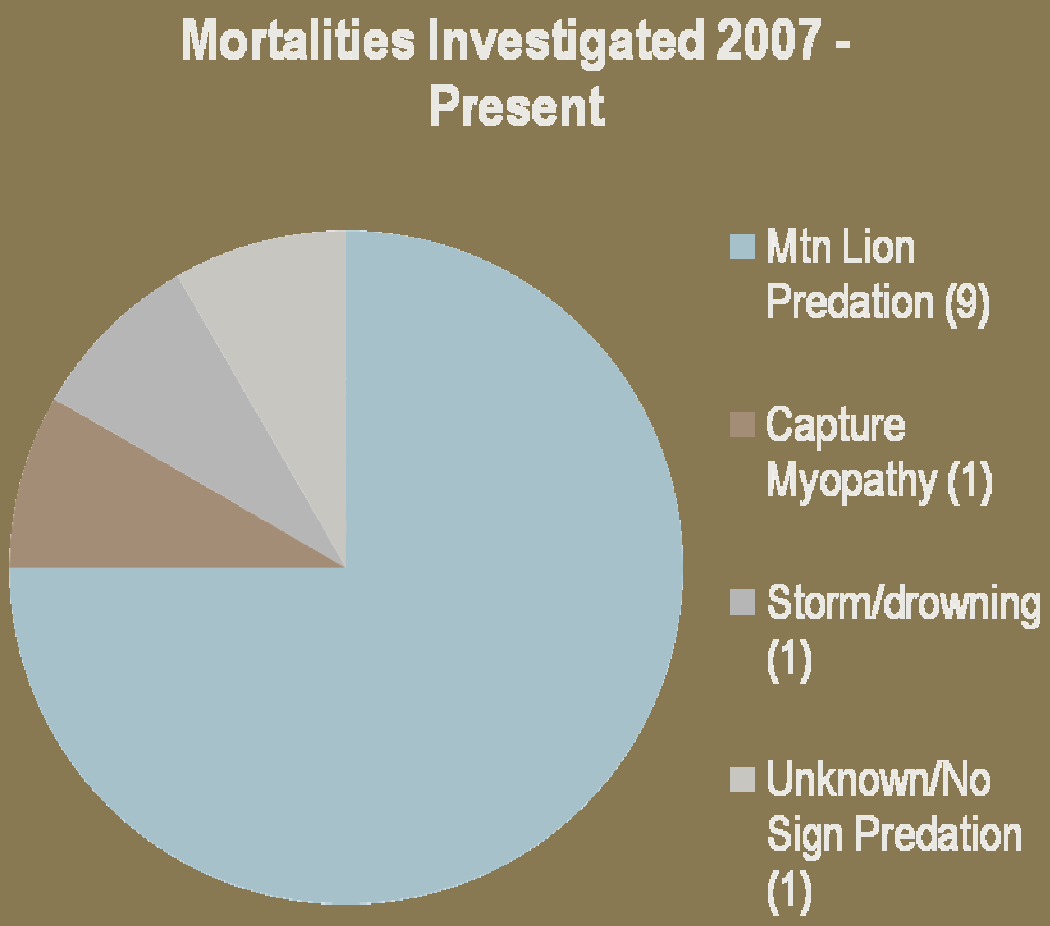
- Transplants
- Disease
- Disturbance
- Drought
- Predation

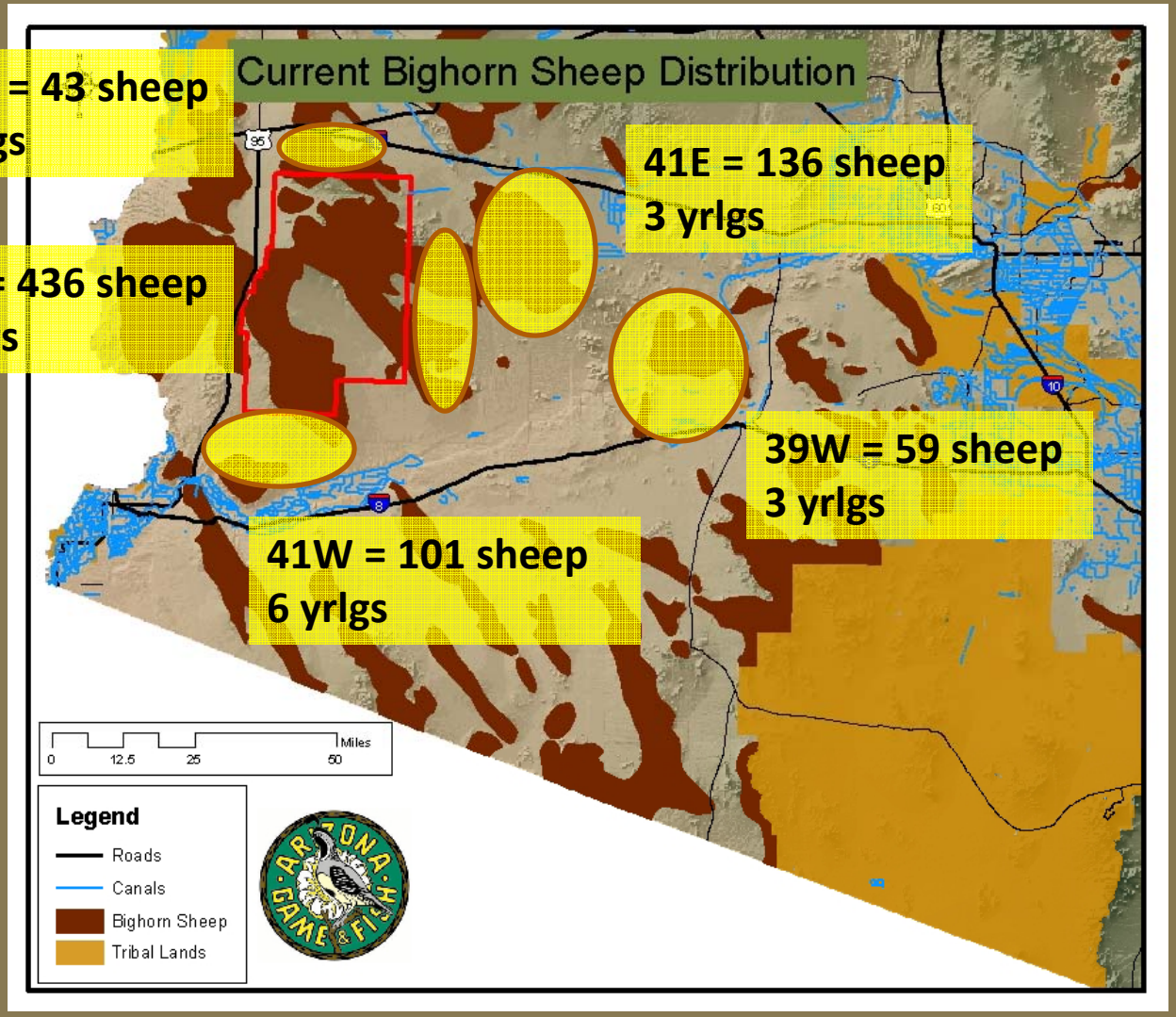
Radio-collared Sheep in 1990s





Current Radio-collared Sheep





Total population (2008) = 767 sheep,
51 yearlings
Kofa NWR = 57% of population, 76% of recruitment

12 6:18AM

Bighorn Sheep predation rates by radio collared lions

- KM01 = 1 BHS every 19 days.
- KM02 = 1 BHS every 52 days.
- KM03 = 1 BHS every 26.5 days.
- KM04 = 1 BHS every 10.5 days.
- RM01 = 1 BHS every 56 days.
- Estimated average rate = 1 BHS every 32.8 days.

Estimated Annual Bighorn Mortality

Waiting List for Sheep

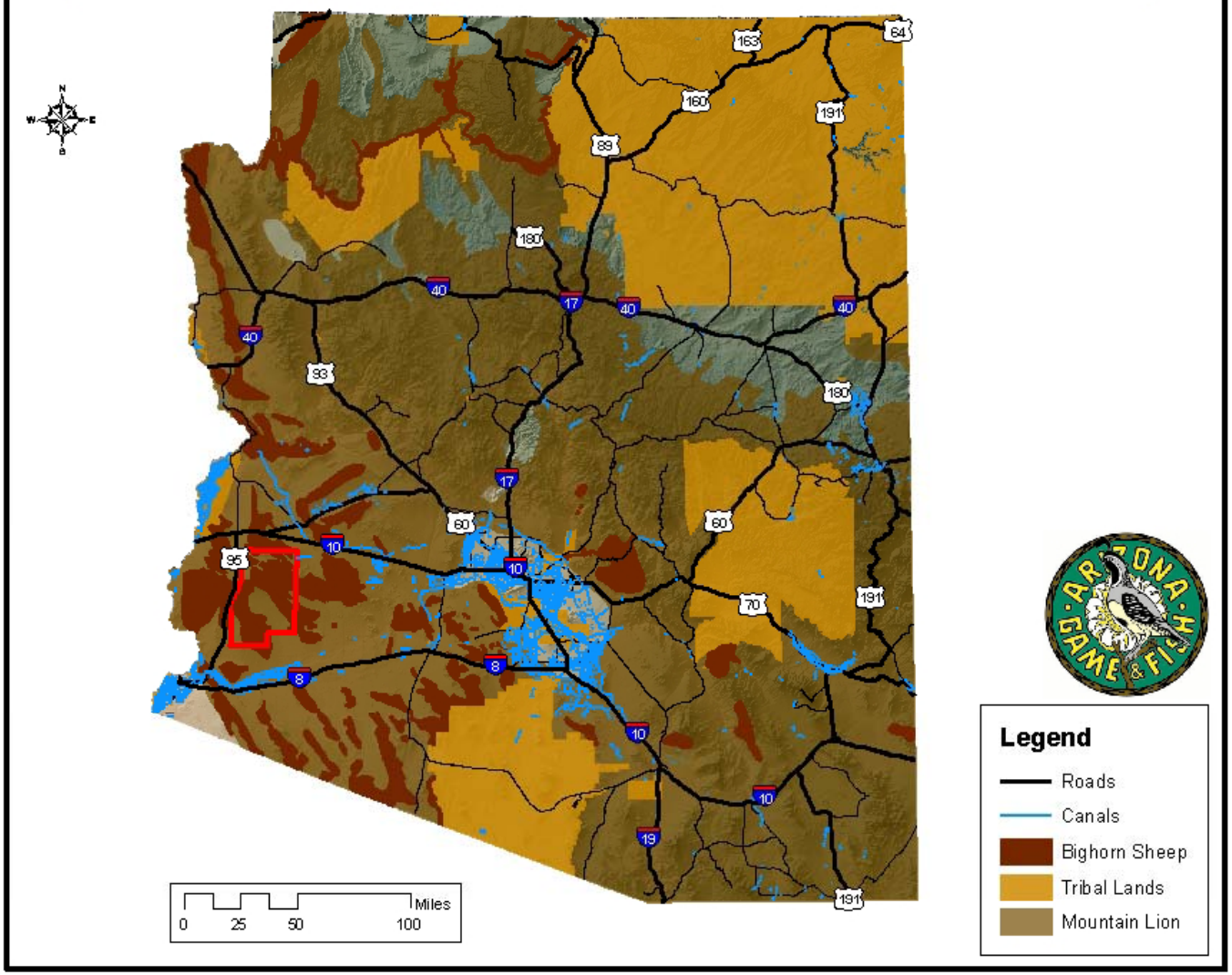
- Arizona
  - Mineral, Estrella, Superstition/Goldfield, Table Top, Maricopa, Santa Catalina, Gila Bend, Bighorn, Sauceda, Buckskin, Buckeye Hills, Harquahala, Black
- New Mexico
  - San Andres

Endangered Isolated Populations

- Sierra Nevada sheep in California
  - Distinct, isolated population
  - Endangered
  - 2007 recovery plan to cost $21.7 million/10 years
  - Active lion predation management
- Peninsular sheep in California
  - Distinct, isolated population
  - Endangered
  - 2000 recovery plan to cost $73.253 million
  - Active lion predation management

Questions?

Current Bighorn Sheep and Mountain Lion Distributions



Endangered Isolated Populations

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- Peninsular sheep in California
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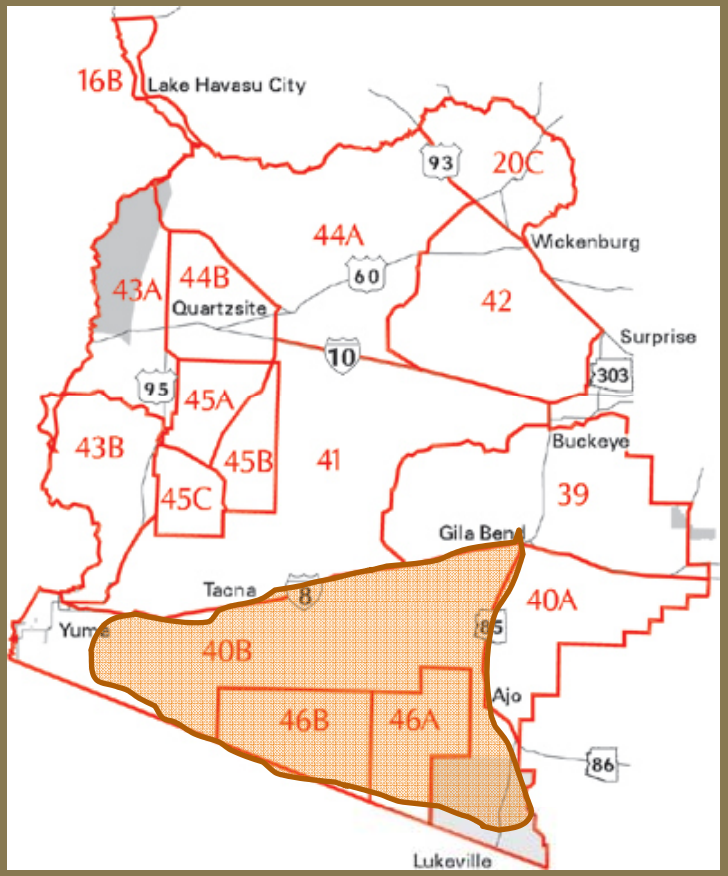
  - Active lion predation management

Sonoran Pronghorn Example

1,500,000 Acres of protected habitat….

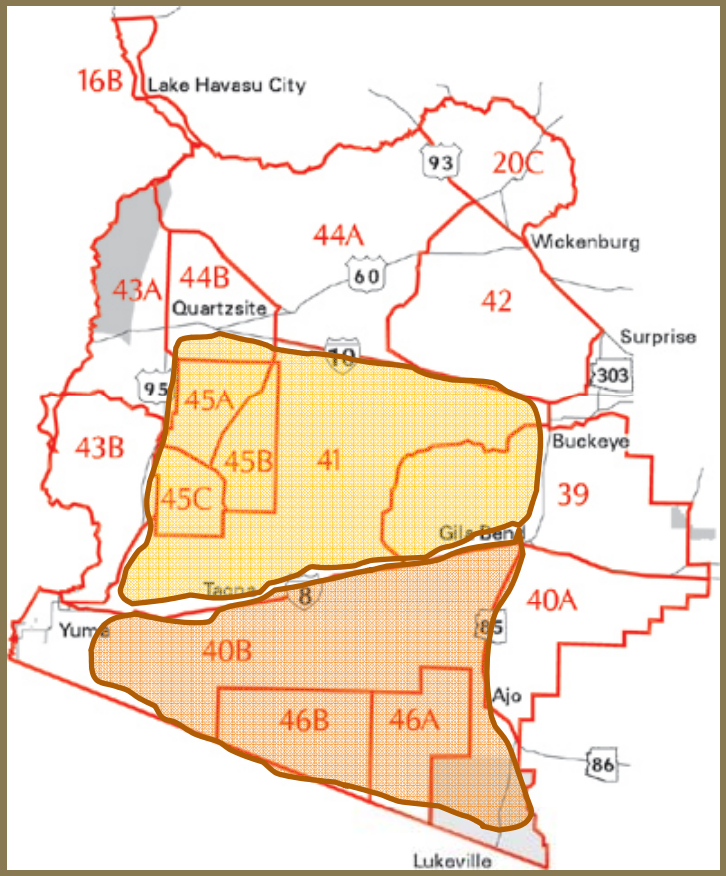


Sonoran Pronghorn Example

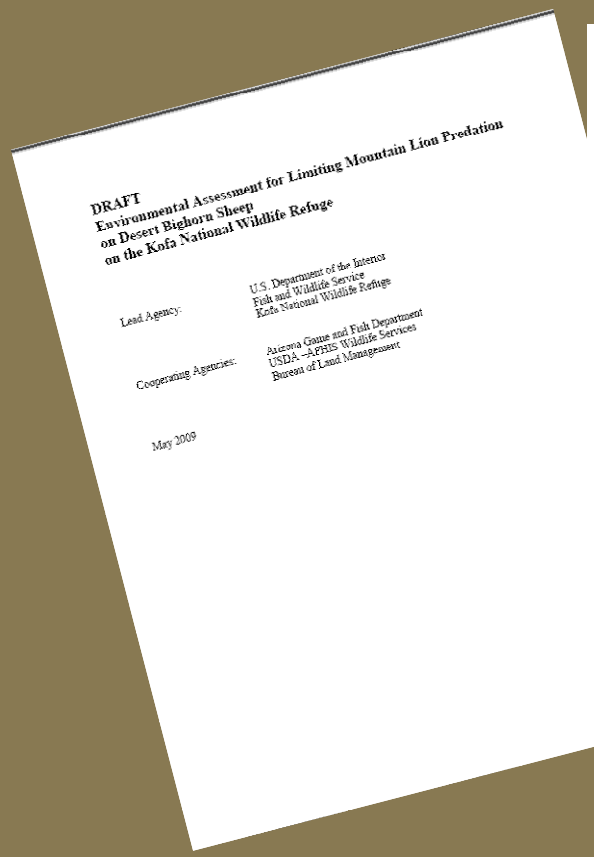
- Endangered Subspecies
- Nearly extirpated – 21 animals in 2002
- Active Management
  - Manmade water sources
  - Forage enhancements
  - Captive breeding
- Currently over 100 animals
- Preparing for 2nd population

Active Management vs. Protection

Can we do nothing and let nature fix itself?



Analysis and Decisions

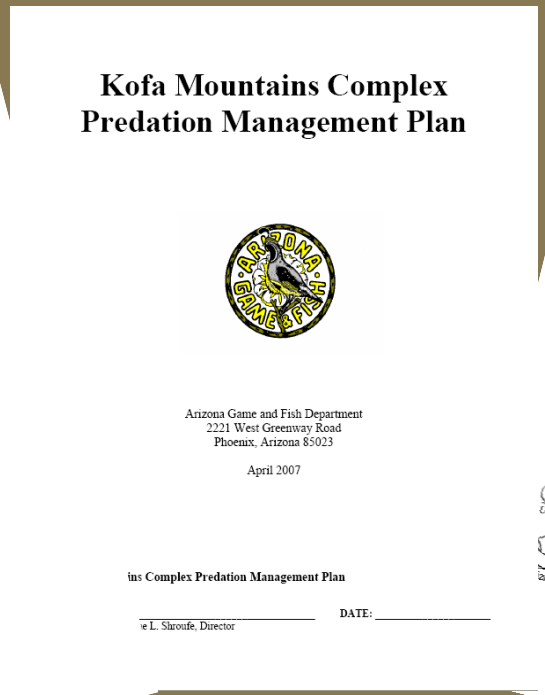


DRAFT
Environmental Assessment for Limiting Mountain Lion Predation on Desert Bighorn Sheep on the Kofa National Wildlife Refuge

Lead Agency: U.S. Department of the Interior, Fish and Wildlife Service, Kofa National Wildlife Refuge

Cooperating Agencies: Arizona Game and Fish Department, USDA –APHIS Wildlife Services, Bureau of Land Management

May 2009



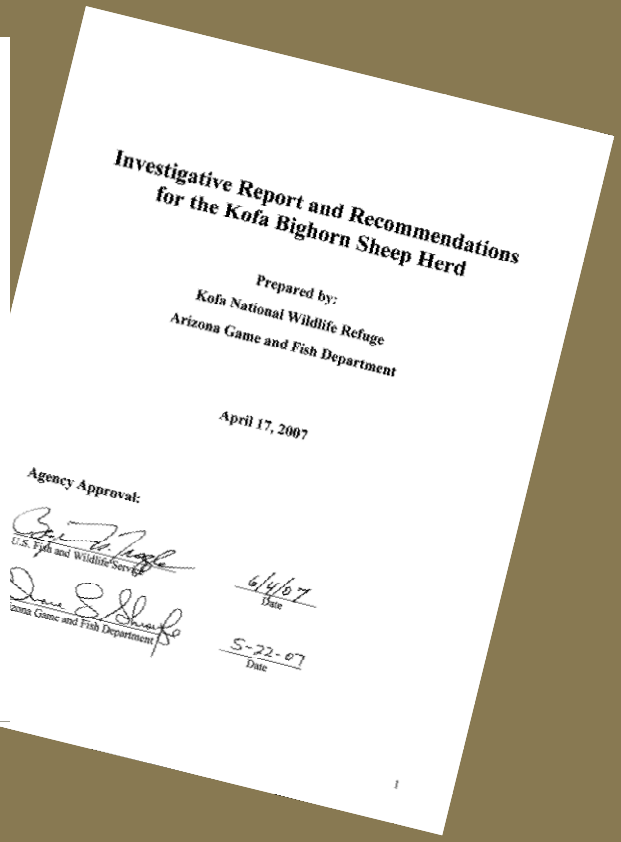
Kofa Mountains Complex Predation Management Plan

Arizona Game and Fish Department
2221 West Greenway Road
Phoenix, Arizona 85023

April 2007

ins Complex Predation Management Plan

_____ DATE: _____
e L. Shroufe, Director



Investigative Report and Recommendations for the Kofa Bighorn Sheep Herd

Prepared by:
Kofa National Wildlife Refuge
Arizona Game and Fish Department

April 17, 2007

Agency Approval:

U.S. Fish and Wildlife Service — 6/4/07 Date

Arizona Game and Fish Department — 5-22-07 Date

1

www.azgfd.gov

- Statement of Purpose
- Where We Stand
- Overview
- Kofa NWR Maps
- King of the Mountain
- History of Management
- Frequently Asked Questions
- Survey Program
- Water Management
- Translocation Program
- Predation Management
- Bighorn Sheep Hunting
- Disease Monitoring
- Recreational Activity
- Kofa Photos
- Press Releases
- References
- Contact Information

INFORMATION & EDUCATION
INSIDE AZGFD
MULTIMEDIA
FAQS

- AZGFD lethally-removes mountain lion to assist struggling bighorn sheep
- 2009 survey flights scheduled for fall, results anticipated in Nov.
- AZGFD reduces bighorn sheep tags by 33% on Kofa NWR
- 2008 bighorn sheep survey estimates = 436 animals
- Historically population averages = 732 animals

Photo Credit = Todd Newport

Welcome to the Arizona Game and Fish Department's Kofa National Wildlife Refuge wildlife management Web site. The primary purpose of this Web site is to provide information about the Department's efforts (in conjunction with its U.S. Fish and Wildlife Service partner) to restore and sustain the desert bighorn sheep herd residing in the Kofa Mountains Complex.

- Updates
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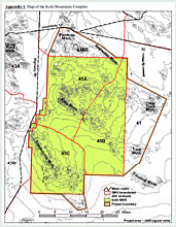
The Kofa National Wildlife Refuge is the critical center of the Kofa Mountains Complex bighorn population and represents both a unique wildlife resource and a significant long-term wildlife management challenge to which the Department is committed for the long haul.

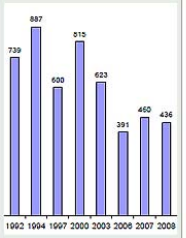
Fish Departments position

Map of the Kofa Mountains Complex Predation Area



[pdf, 256kb]

Kofa bighorn sheep survey data 2008 estimates = 436



2008 Survey results news release [pdf, 37kb.]

Sheep Population Recovery Strategies

- **Estimate population parameters of the Kofa bighorn sheep population.**
- **Ensure year-round water availability for all bighorn sheep on the Kofa NWR.**
- **Monitor disease occurrence within the Kofa NWR bighorn sheep population.**
- **Reduce the potential for disease transmission between feral goats and sheep and wild bighorn sheep.**

Sheep Population Recovery Strategies

- **Reduce the negative impacts of human recreational activities on bighorn sheep.**
- **Continue management of the Kofa NWR bighorn population as a transplant source herd.**
- **Continue to offer bighorn sheep hunting opportunities consistent with sheep conservation.**
- **Raise public awareness of the value of bighorn sheep on the Kofa NWR and the need for active management to maintain the herd.**

Sheep Population Recovery Strategies

- **Determine cause and extent of predation when bighorn population declines are documented.**
- **Reduce predation mortality on sheep while the population is below the long-term average of 800 and there is evidence that predation is limiting bighorn population recovery.**
- **Monitor recovery of the sheep population when predator control is implemented.**

Adaptive Management

…….a decision process that promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Adaptive Management is one process for informing decisions, whereby the Department:

(1) Develops management actions based upon scientific and other information;

(2) Implements those actions with a structured plan of monitoring; and

(3) Evaluates the performance of those actions based upon analysis of that monitoring data and other relevant information. The evaluation of performance of the action is used to subsequently modify the action if warranted. Adaptive Management may include direct or indirect stakeholder involvement in the development of actions and assessment of performance.

Proposed Action on Kofa

- Recover Kofa sheep herd
- Data and science indicates lion predation is limiting recovery of the sheep herd
- Removal (lethal) of individual lions that prey on sheep is warranted
- When the declining trend is reversed we can stop removal of lions
- Collect data continuously, monitor effects of actions, alter actions as appropriate