

A California Condor is shown in flight, with its wings fully extended. The bird has a white head and neck, a dark body, and large, brown wings. It is flying against a clear blue sky. The text is overlaid on the image.

# California Condor Wind Energy Work Group

July 13, 2011



First recorded sighting  
Monterey Bay, CA

First specimen (Menzies)  
Monterey County, CA

Finley studies condor pair  
San Gabriel Mountains, CA

1602

1792

1906



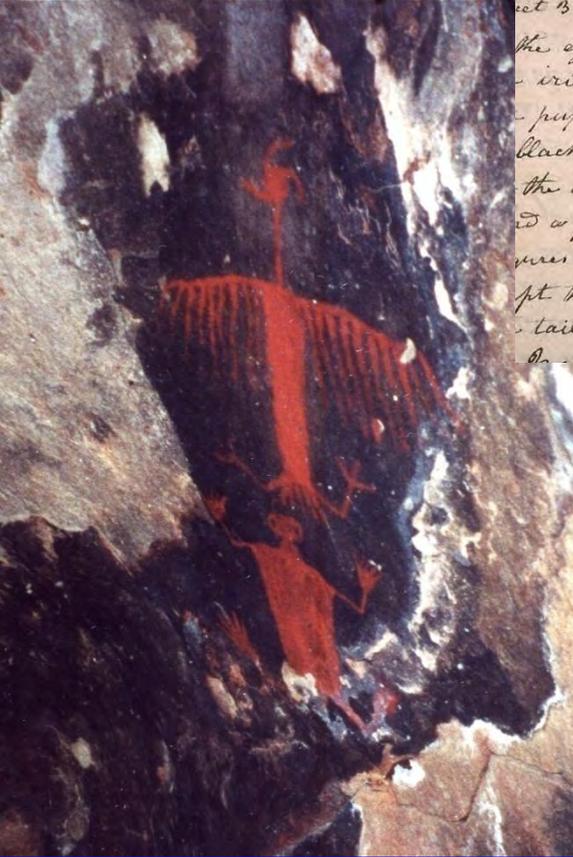
William L. Finley 1902

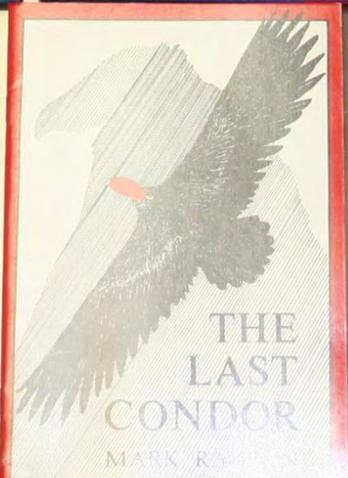
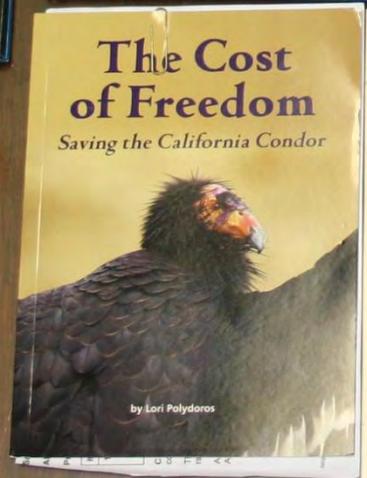
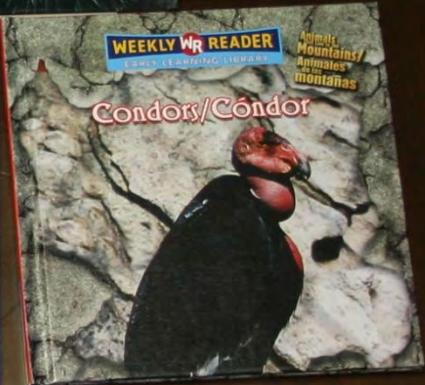
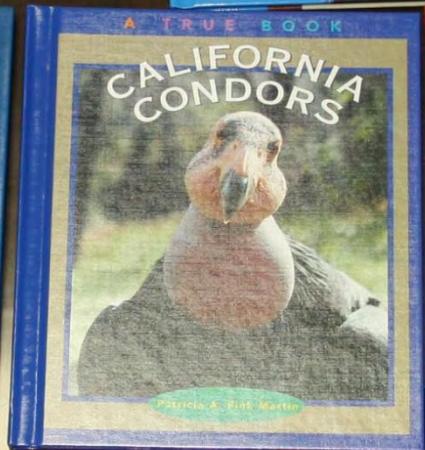
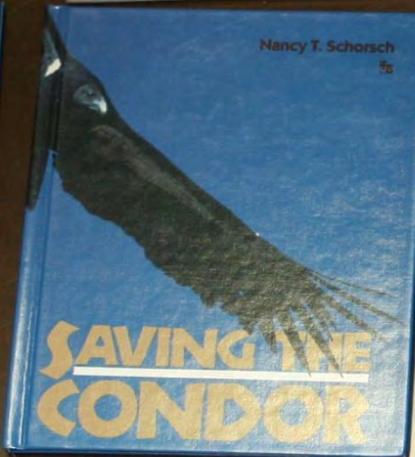
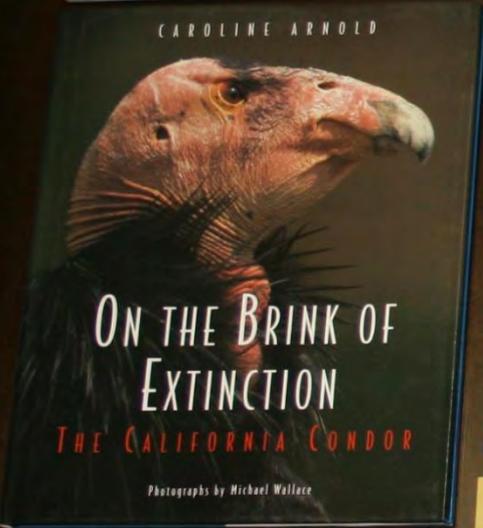
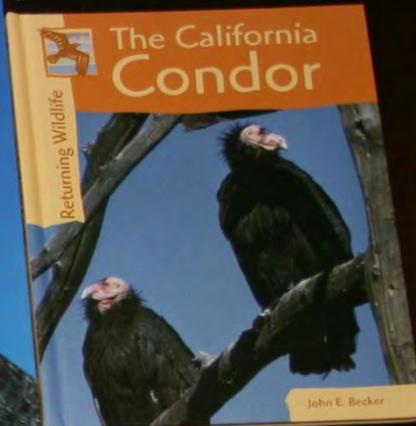
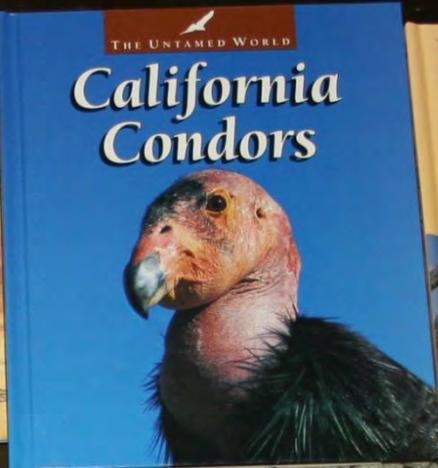
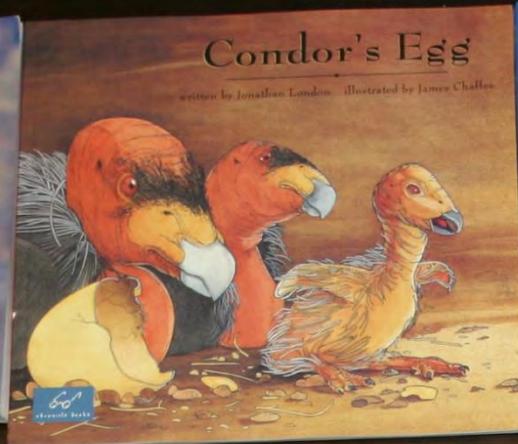
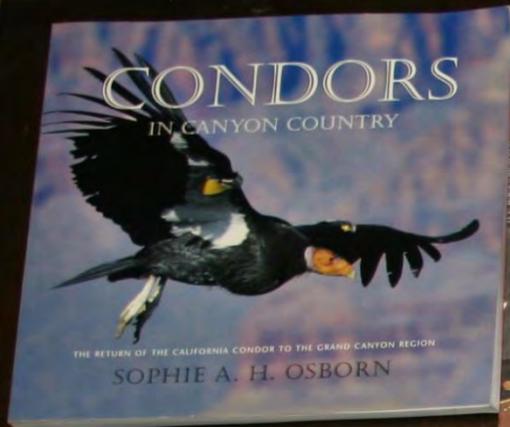


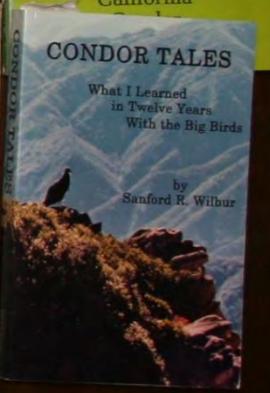
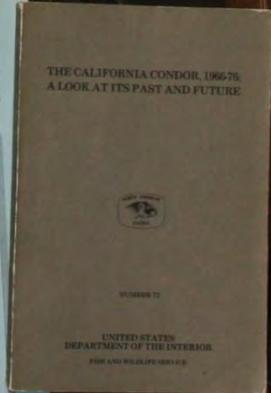
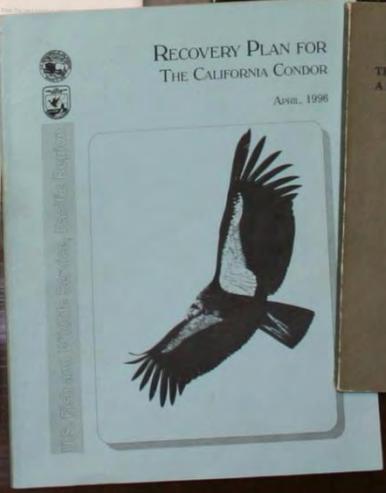
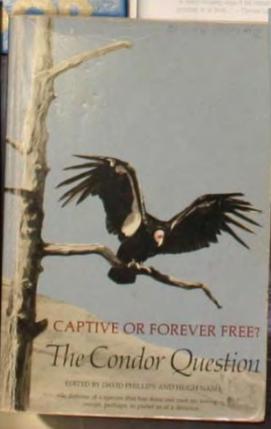
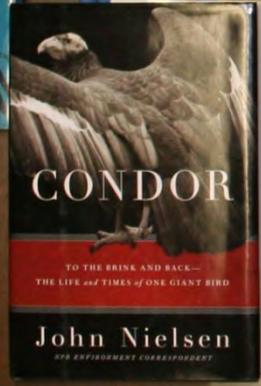
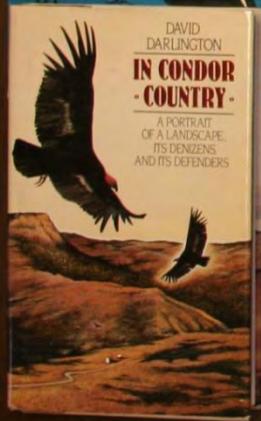
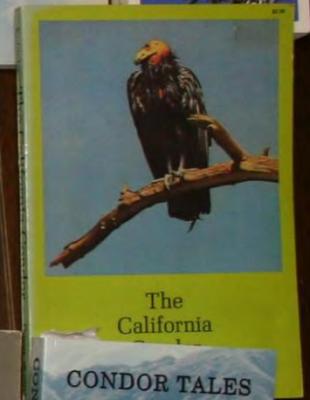
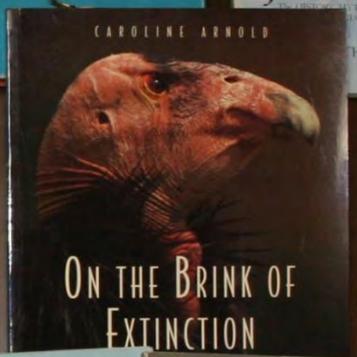
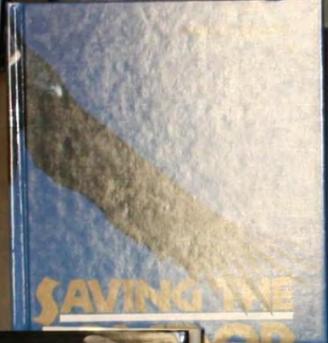
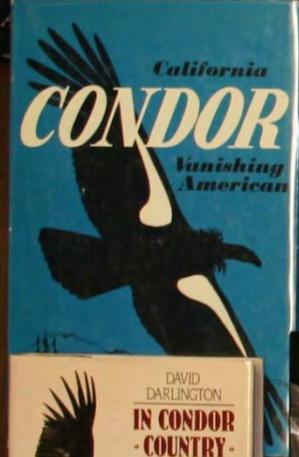
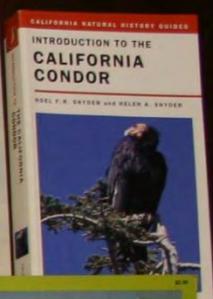
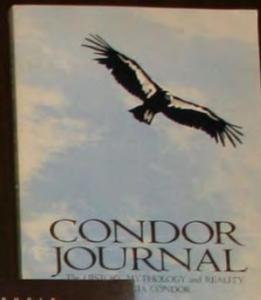
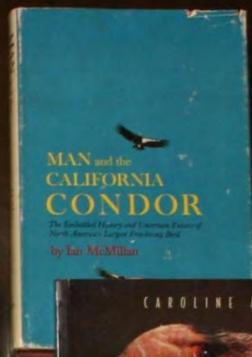
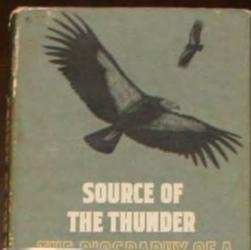
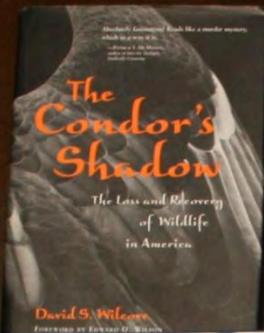
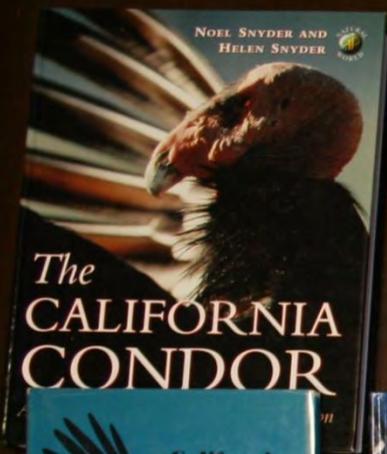
# San Gabriel Mtns.-2009



# The California Condor







# Cathartidae



Andean Condor



California Condor



Black Vulture



King Vulture



Greater  
Yellow-headed Vulture



Lesser  
Yellow-headed Vulture



Turkey Vulture

Body length - 46 to 55 inches

Standing Height - 45 to 55 inches

Wing Span - 9 to 9.5 feet

Weight - 17 to 25 pounds

Lifespan – 60 plus years

**Gymnogyps**  
***californianus***



# SIZE COMPARISON OF SOME OF THE LARGER

## NORTH AMERICAN BIRDS

About how big is a condor?



Artwork by Tony Pingitore.

	Approximate Wingspan (in feet)	Approximate Weight (in pounds)
CALIFORNIA CONDOR ...	up to 9½	about 20 (up to 31)
White Pelican .....	up to 9½	about 15 (up to 30)
Trumpeter Swan (male) ....	about 8	21-38
Whistling Swan (male) .....	6-7	12-19
Whooping Crane .....	about 7	about 15
Golden Eagle .....	about 7	about 10
Turkey Vulture .....	about 6	about 5
Wild Turkey (male) .....	4-5	about 20 (rarely to 30)



Condors, hanggliders and paragliders want  
the same air











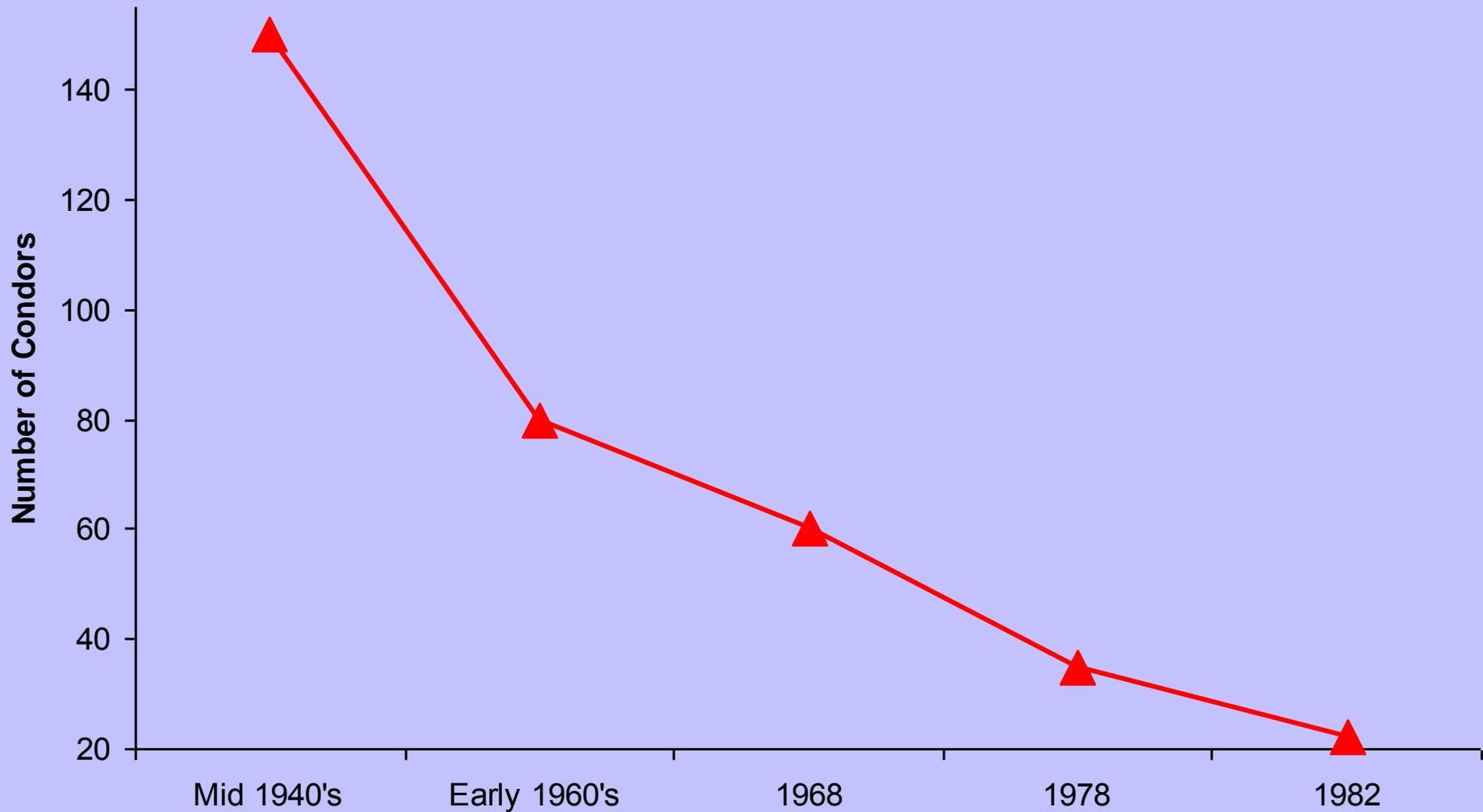








# Estimated Historical Wild Population



# Population Trend in the 1980's

- Twenty-two birds in 1982
  - Fifteen birds by 1983-84
  - Nine birds by 1984-85
  - Three birds by 1986
- 
- However, at the same time the captive population increased as eggs, chicks and adults were taken from the wild.

In 1980 causes for the decline were unknown.

Speculation was birds were not breeding and not finding enough food. But this was unsubstantiated.

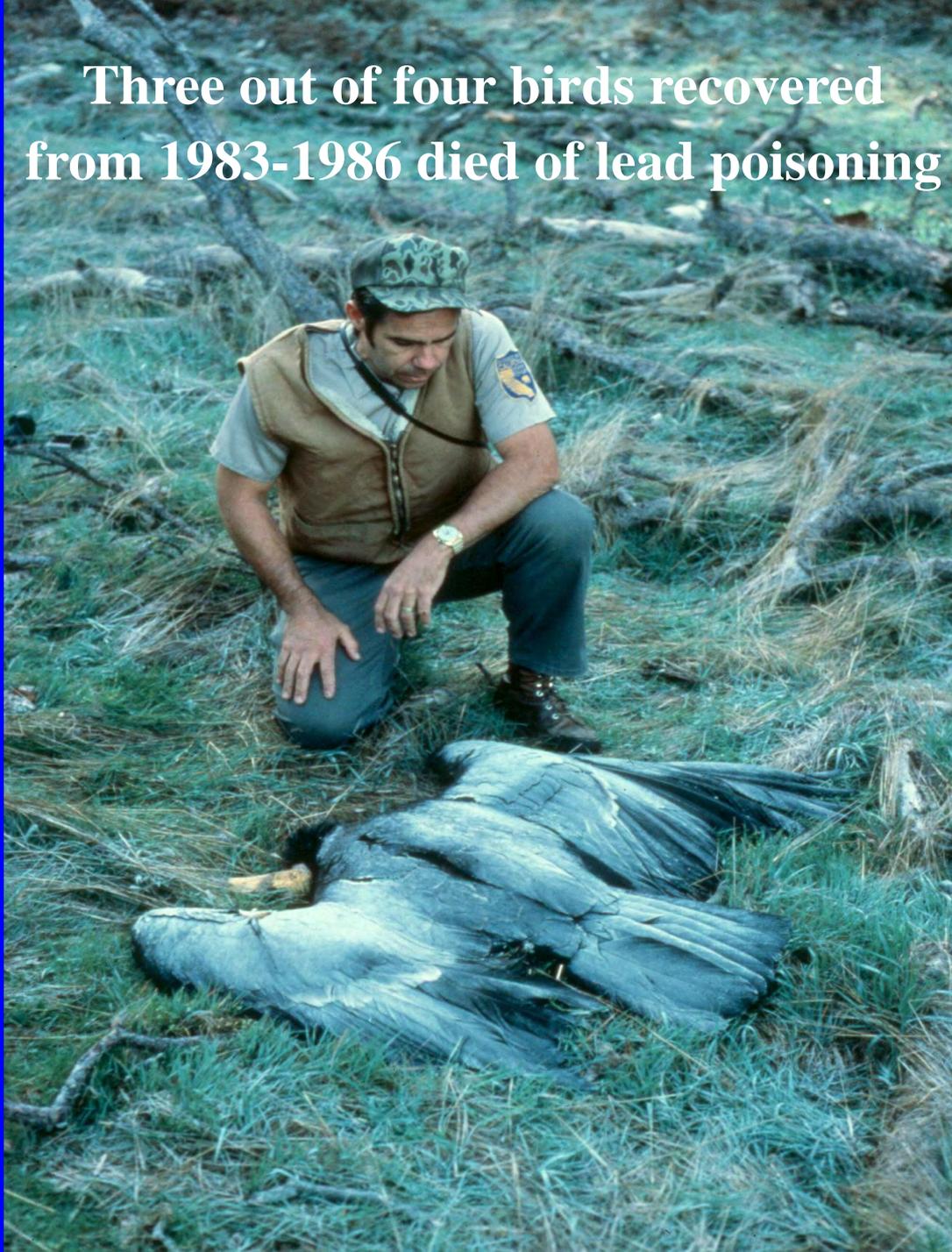


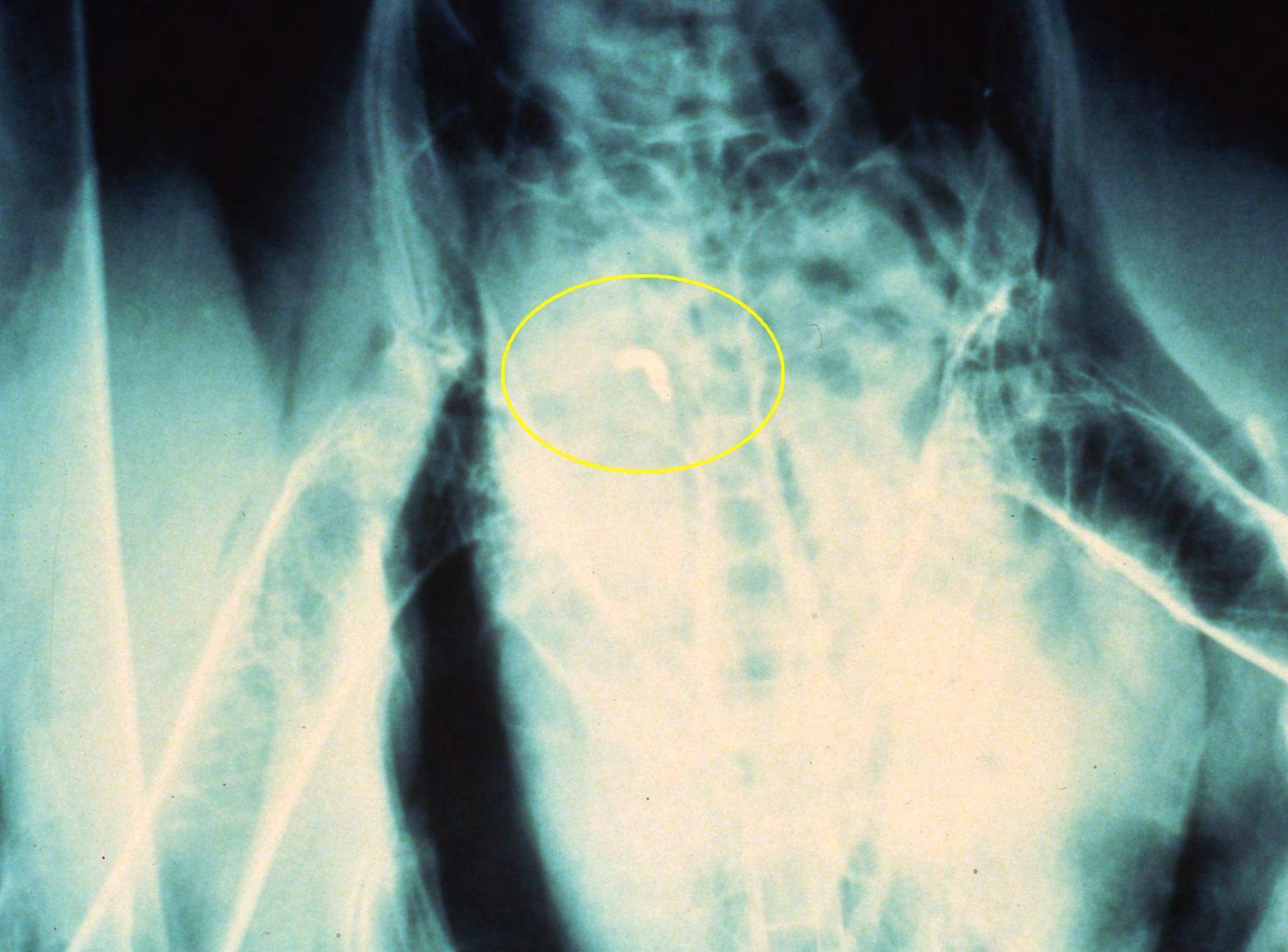
In 1982 the wild population stood at 22 individuals



Glennville, CA 4/27/83

Three out of four birds recovered  
from 1983-1986 died of lead poisoning







Tulare County 4/10/85

# Four stages to recovery

- Rescue- Trapping and removing the last birds from the wild.
- Captive Breeding- Built up numbers to stave off extinction, and produce birds for release.
- Reintroduction-Releasing naïve birds back into the wild...without mentors.
- Creation of a self-sustaining population

Rescue

# Capture of last wild California Condor

April 17, 1987

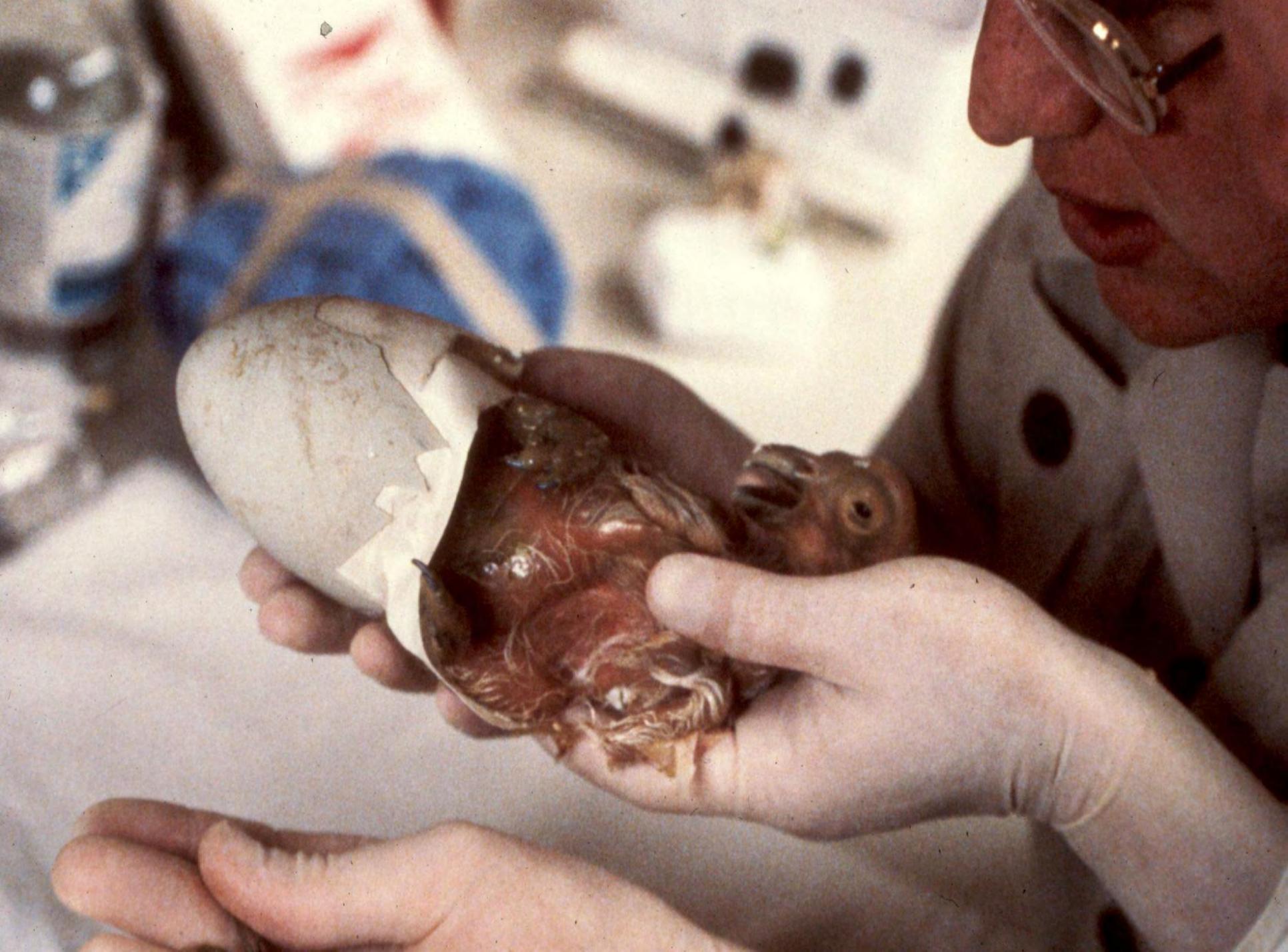
captive population size = 27



# Captive Breeding



In 1988 the first pair of wild trapped birds produced an egg in captivity. This began the successful captive breeding program, and in reality the saving of the species.



Reintroduction

# Releasing naïve birds back into the wild



Initial releases began in January 1992



**Southern California**



**Northern Arizona**



**Central California**



**Baja California, MX**







# Creation of a Self-Sustaining Population



Successful breeding in the wild

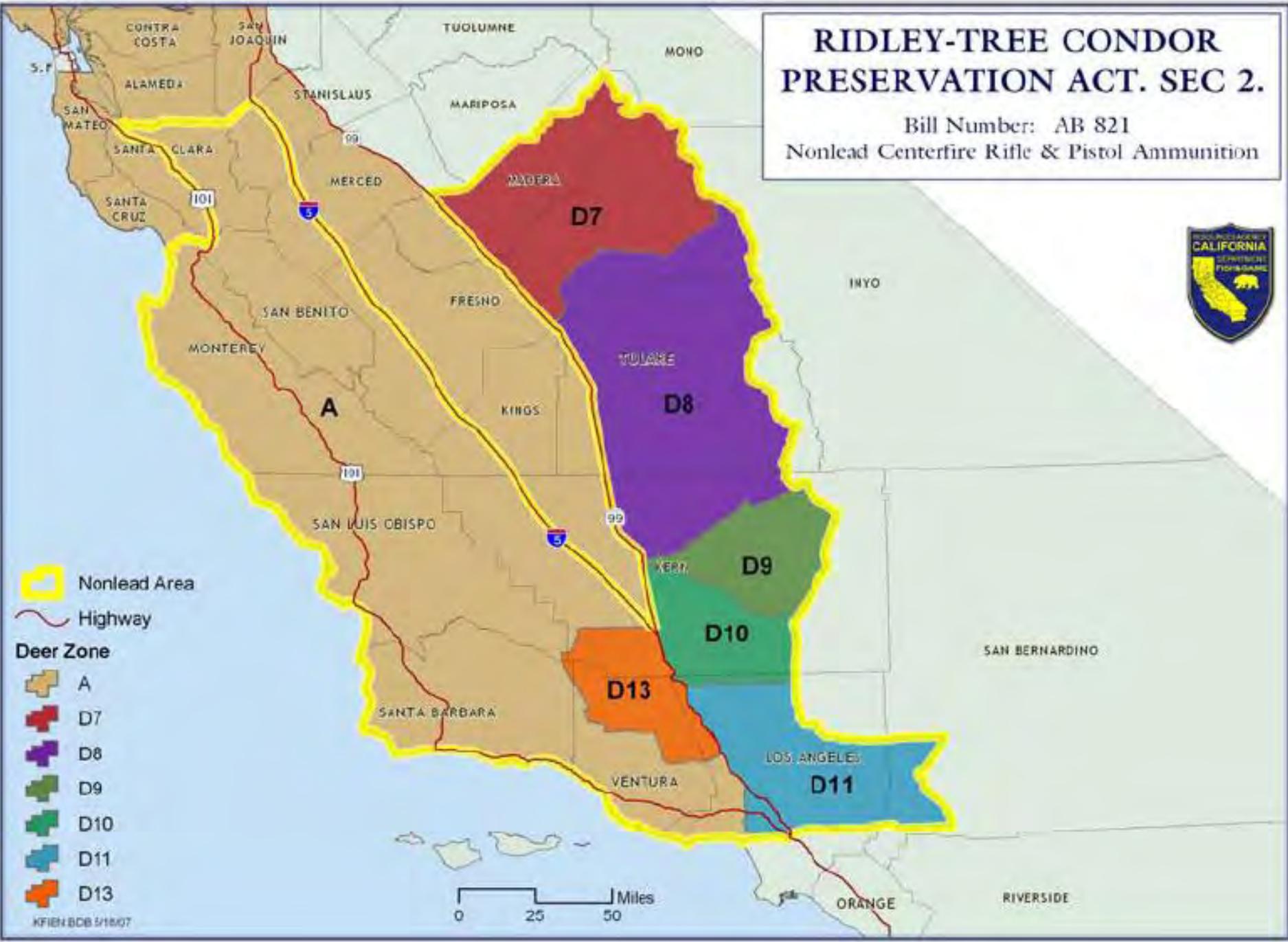


# Causes of Mortality

- Power line collisions
- Lead Toxicosis
- Predation
- West Nile Virus
- Starvation
- Deliberate shooting
- Microtrash Ingestion
- Many unknowns

# RIDLEY-TREE CONDOR PRESERVATION ACT. SEC 2.

Bill Number: AB 821  
Nonlead Centerfire Rifle & Pistol Ammunition

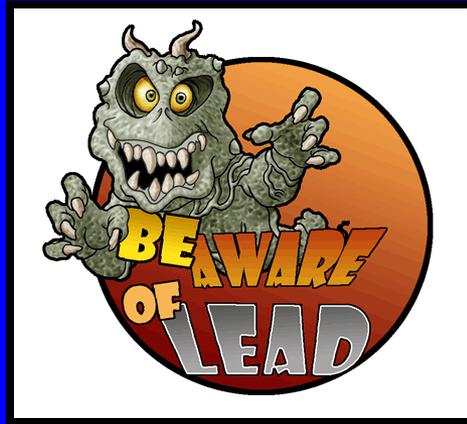


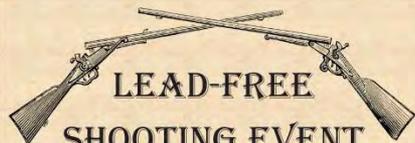
Nonlead Area

Highway

### Deer Zone

- A
- D7
- D8
- D9
- D10
- D11
- D13





## LEAD-FREE SHOOTING EVENT

Saturday, July 18, 2009  
10:00 am - 3:00 pm  
Camp Roberts

**FREE ADMISSION**

From Hwy 101 take the Camp Roberts exit and enter main gate  
Bring your own rifle and adequate ear and eye protection.

While supplies last, non-lead ammunition will be provided for:  
.22 Win. Mag., .223 Rem., .22-50 Rem., .243 Win., .25-06 Rem.,  
.270 Win., 7mm Rem. Mag., .30 Carbine, 30/30 Win.,  
.30-06 Spring, .308 Win., .300 Win. Mag., .338 Win. Mag.

Snacks and beverages will be provided

For more information, call IWS at (831) 524-6006





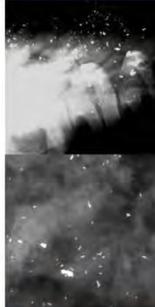


## Education & Outreach Programs



### Hunters Helping Wildlife

- ▶ **Be part of the solution.** The Arizona Game and Fish Department and its partners the Arizona Deer Association, Arizona Elk Society, Arizona Antelope Foundation, Arizona Desert Bighorn Sheep Society, and the Arizona Chapter of the National Wild Turkey Federation ask you to be part of the solution by using non-lead ammunition when hunting in condor country (Game Management Units 9, 10, 12A/B, and 13A/B).
- ▶ **Aid conservation.** Hunters who use non-lead ammunition in condor range carry on sportsmen's proud tradition of wildlife conservation.
- ▶ **Switch ammunition.** Hundreds of hunters have switched to non-lead ammunition, but we need more hunters to help.
- ▶ **Join the effort.** Prove to the critics that this problem can be resolved without mandatory measures.



*Above: The X-rays show hundreds of lead fragments (fragments appear bright white in X-ray) in a deer carcass and gut pile.*

*The typical lead-based bullet loses 40 percent of its mass, which is dispersed along the wound channel. Many of these fragments end up in gut piles that are left in the field.*





BIRDCAM 01

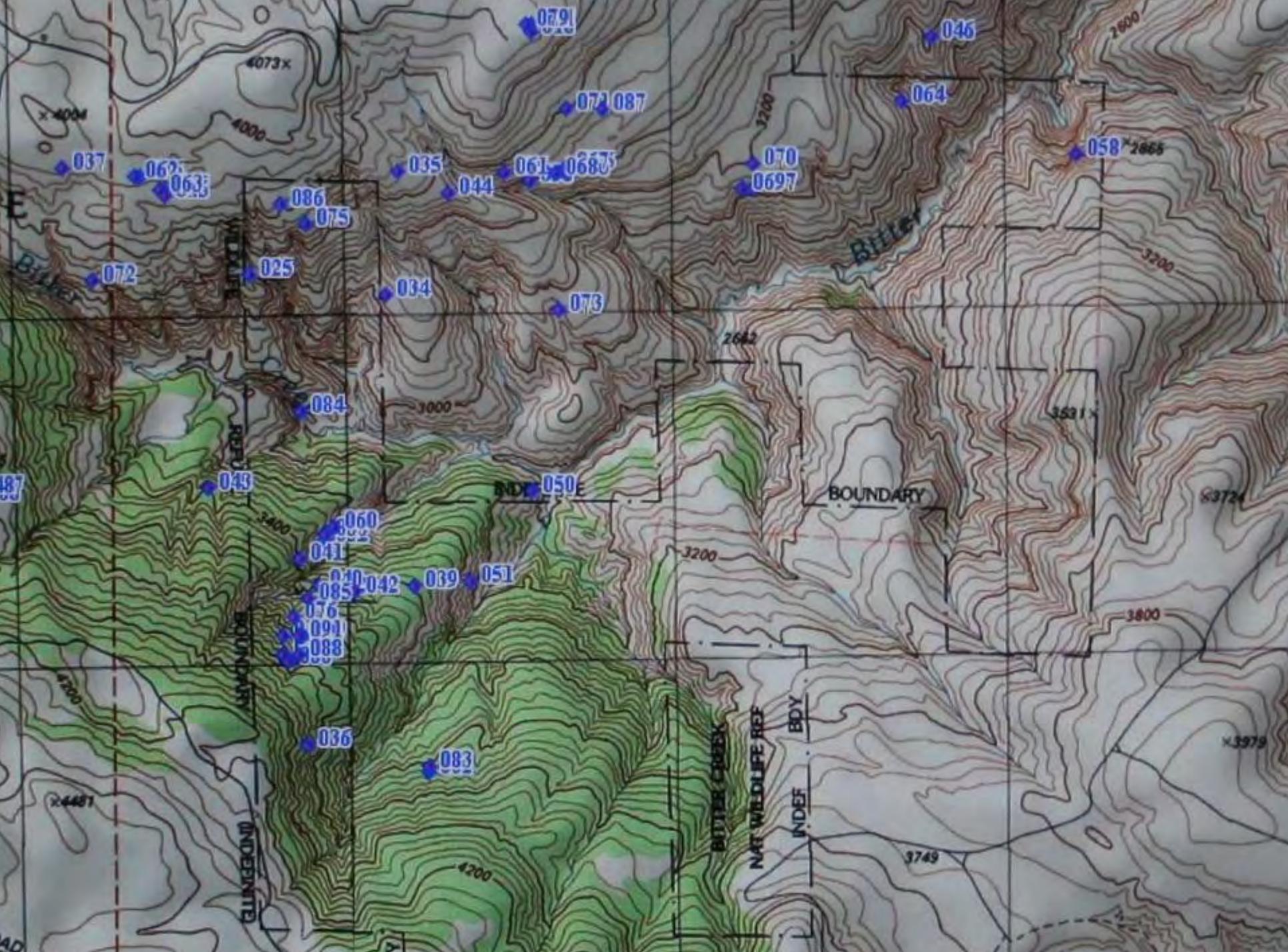
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Condors finding food on their own









0791

046

4073x

072 087

058 2865

037

062  
063

035

044

061 068

070  
0697

E

072

086  
075

025

084

073

BUTTER CREEK

3200

084

3000

050

2662

3521x

BOUNDARY

3724

087

043

050

3200

060  
041

030  
042

039

051

076

091

088

036

083

3800

BUTTER CREEK

NAT WILDLIFE REF

INDEF

BOY

3979

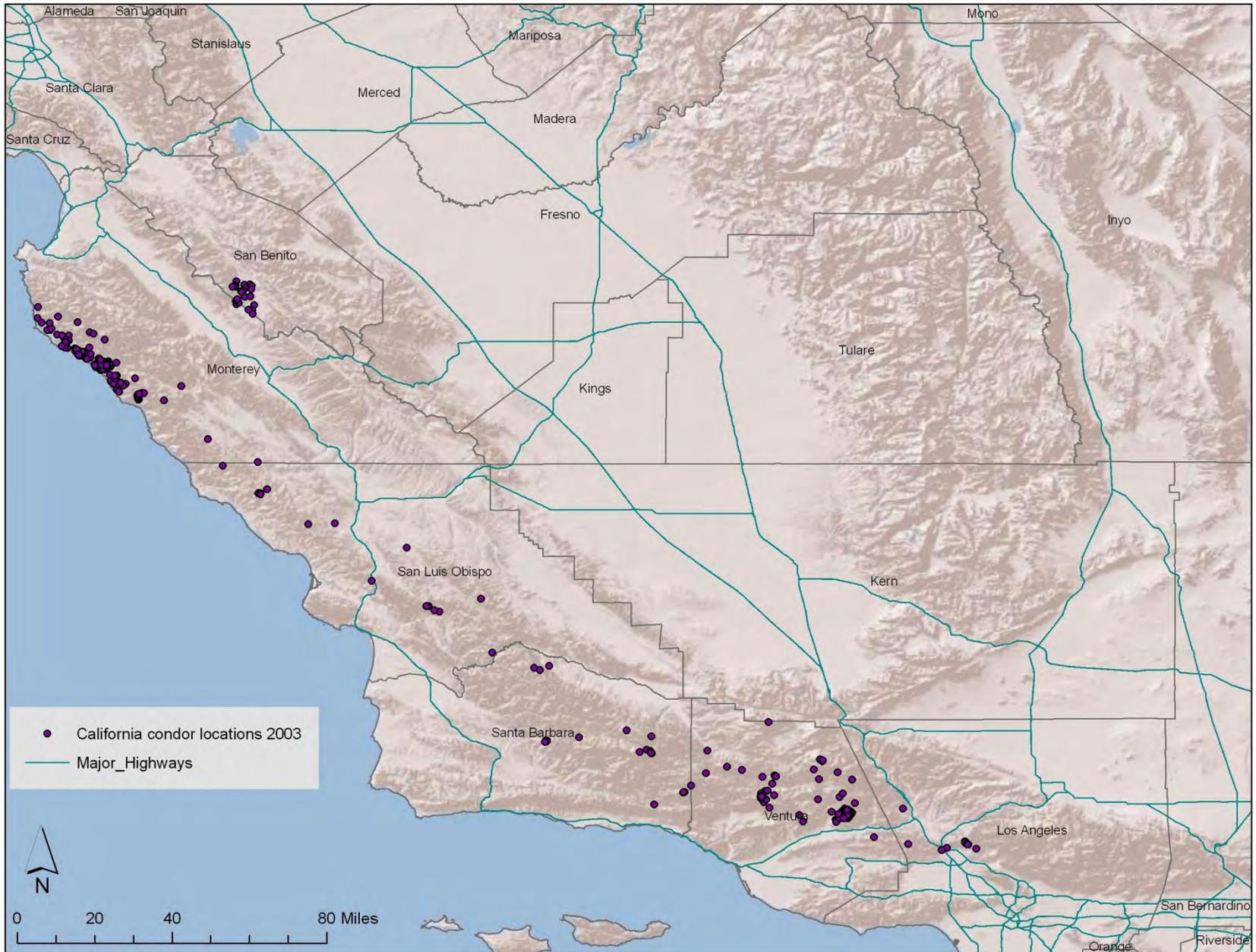
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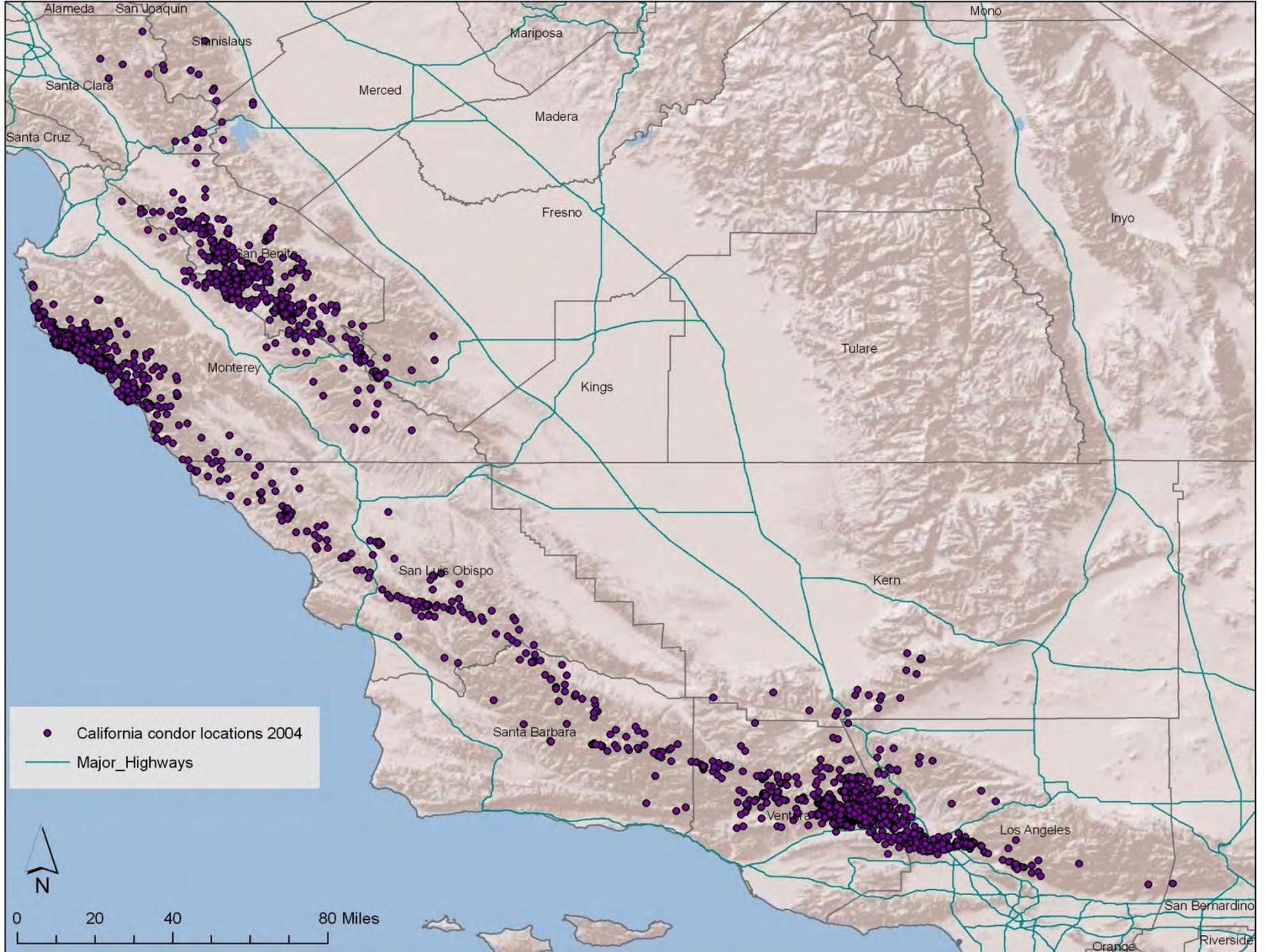
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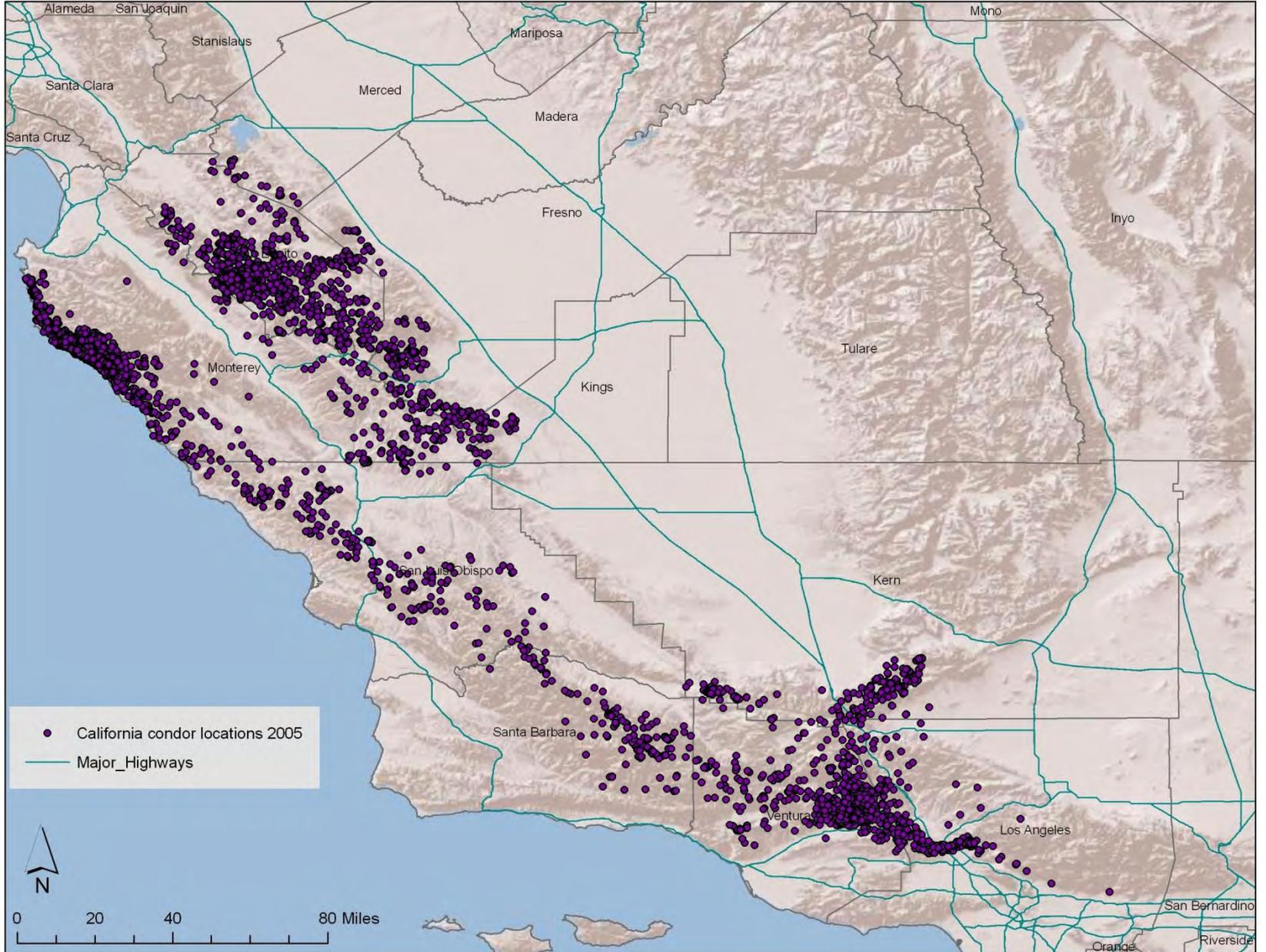
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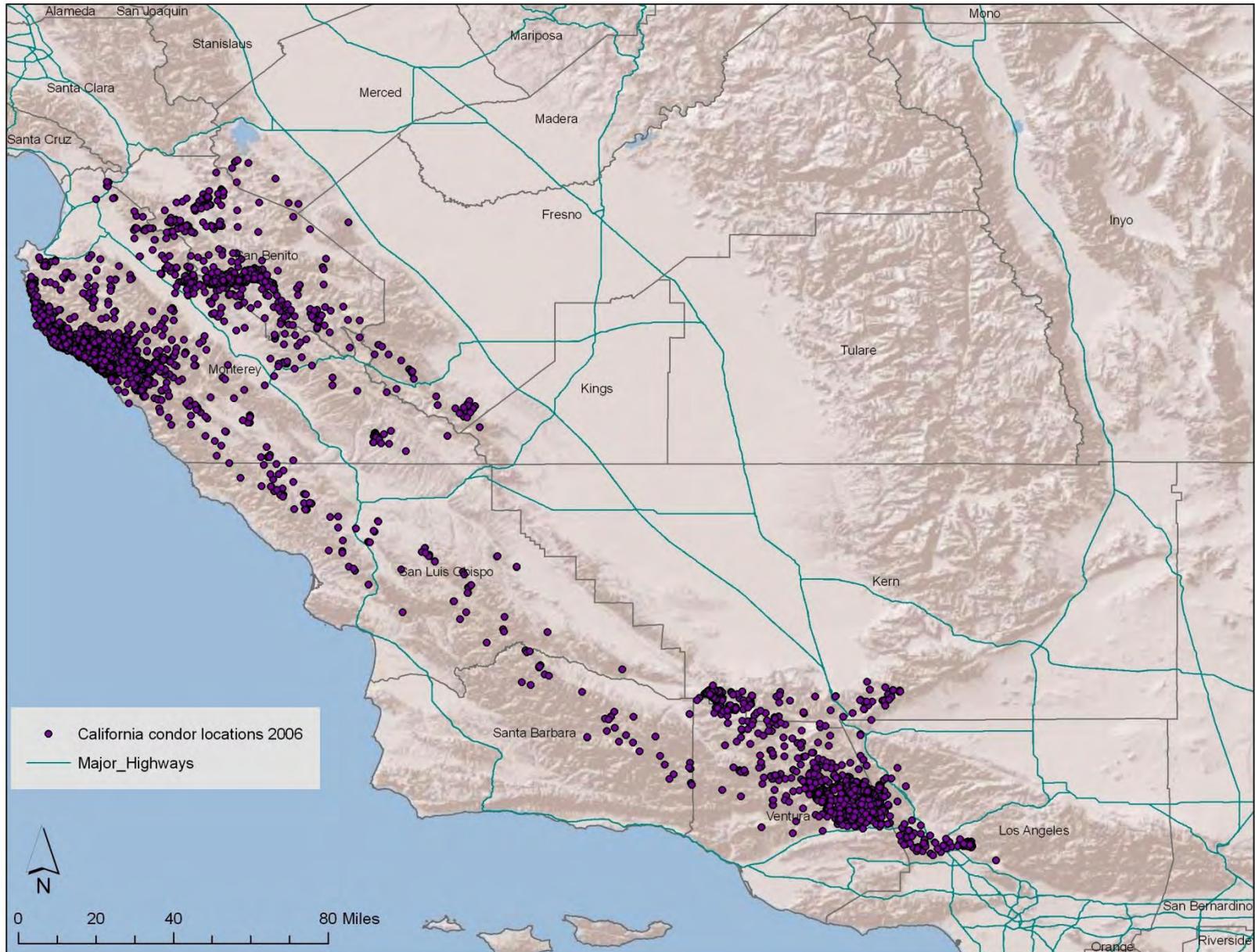
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# 2005

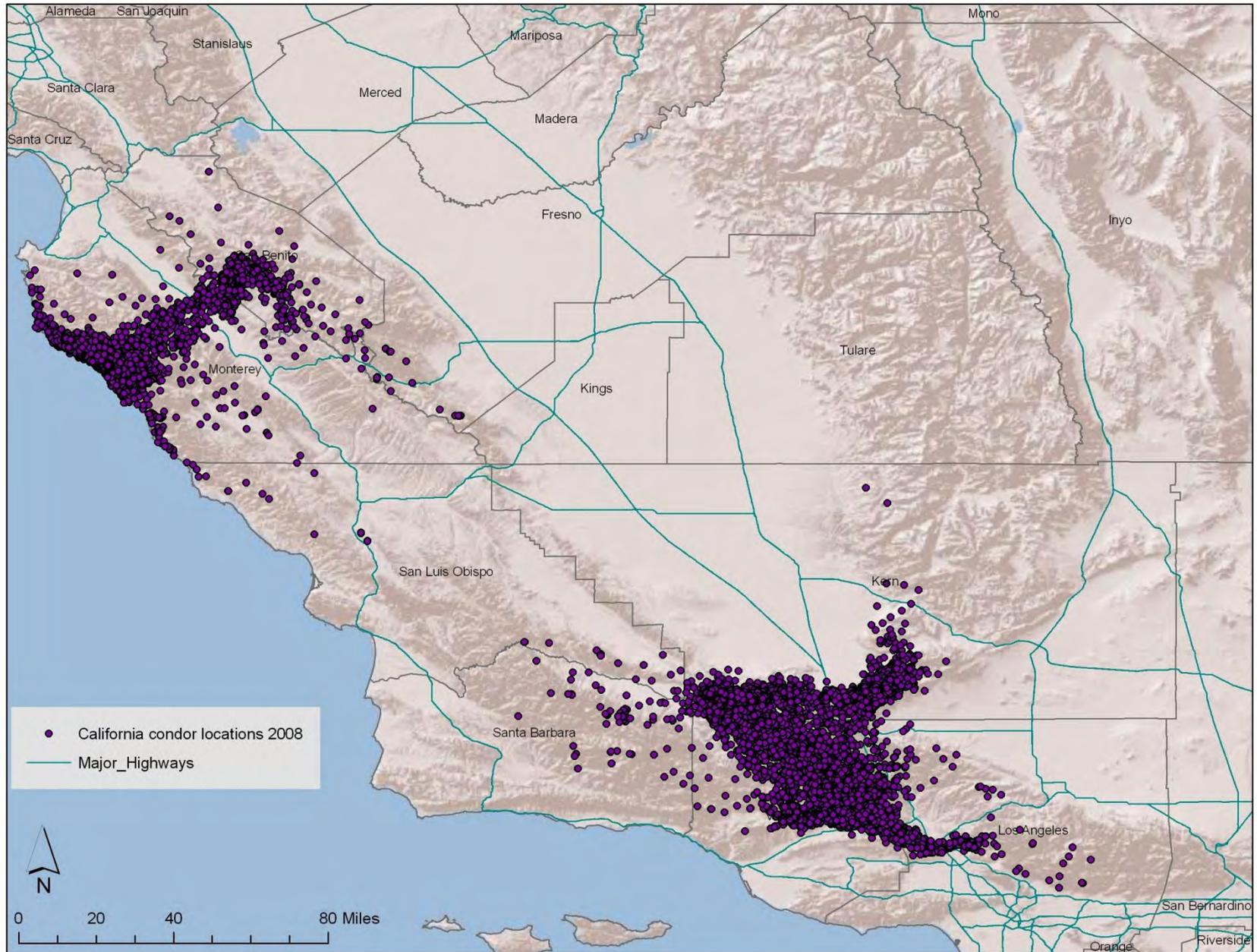


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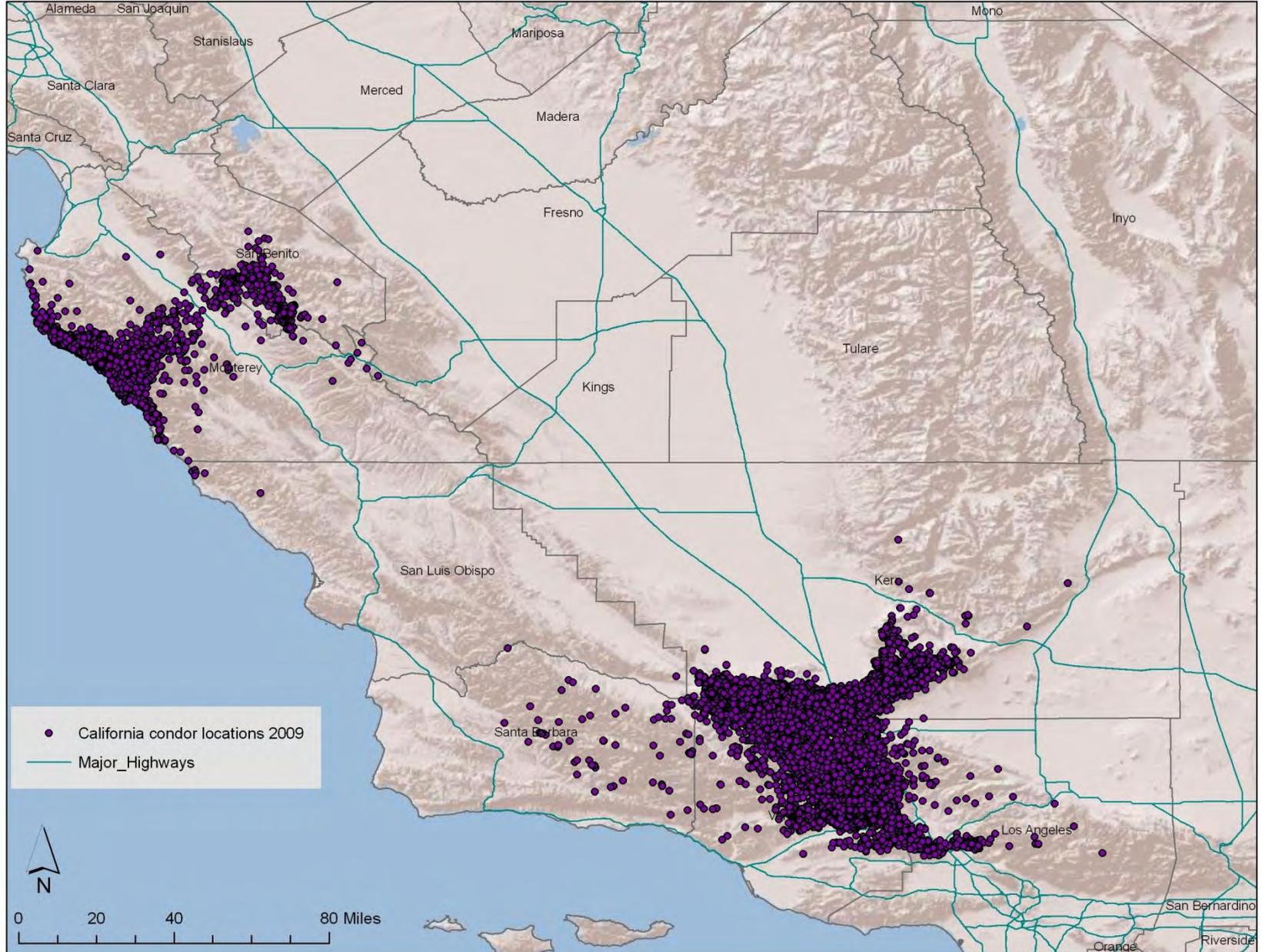




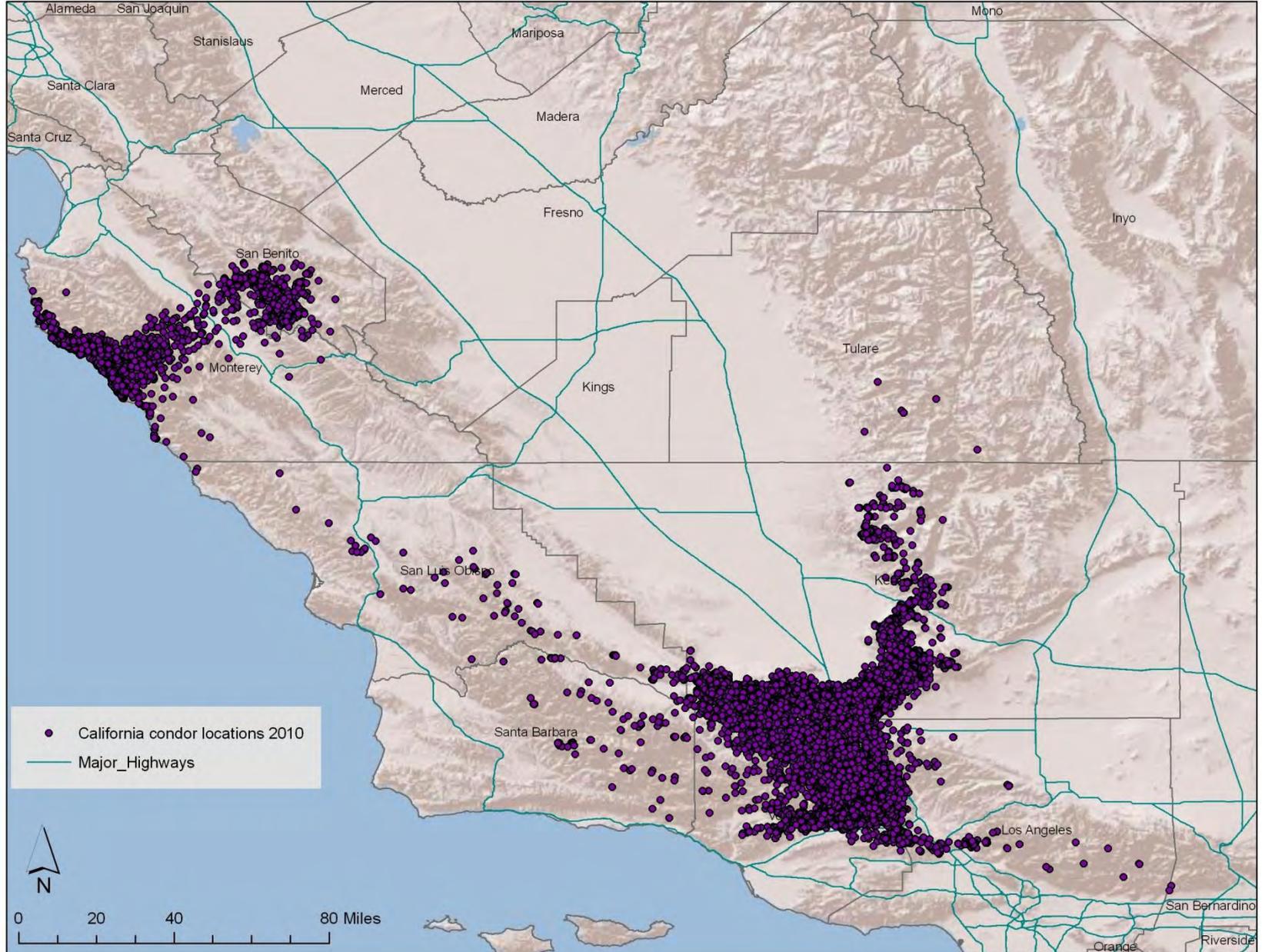
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# 2009



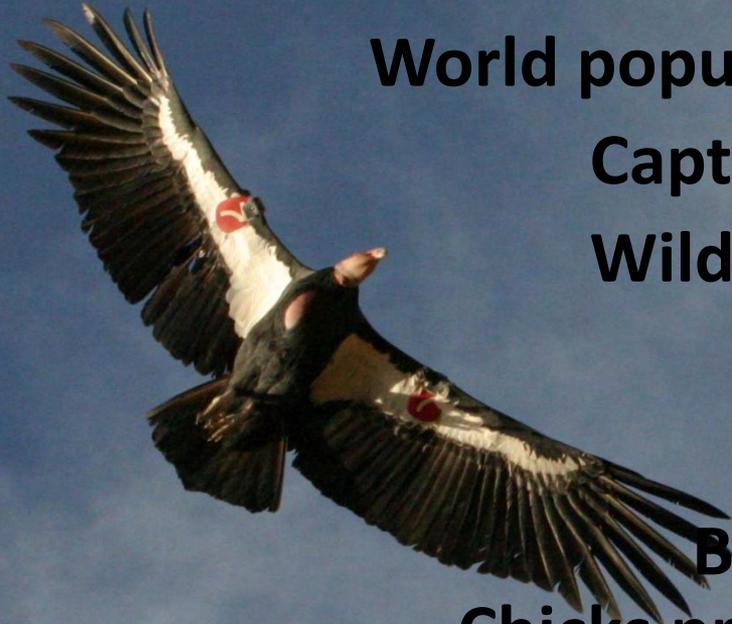
# 2010



# Factors Inhibiting Creation of a Self-Sustaining Population

- Continual changes in habitat values: Loss and degradation of nesting, feeding and roosting habitat
- Continued exposure to lead ammunition
- Long term effects of DDE for coastal feeding birds
- West Nile Virus

# California Condor Population 2011



**World population -399, up from 23 in 1982**

**Captive population 203**

**Wild population 196**

**California 109**

**Grand Canyon, AZ 68**

**Baja California, Mexico 19**

**Chicks produced in 2011- 9 (included)**

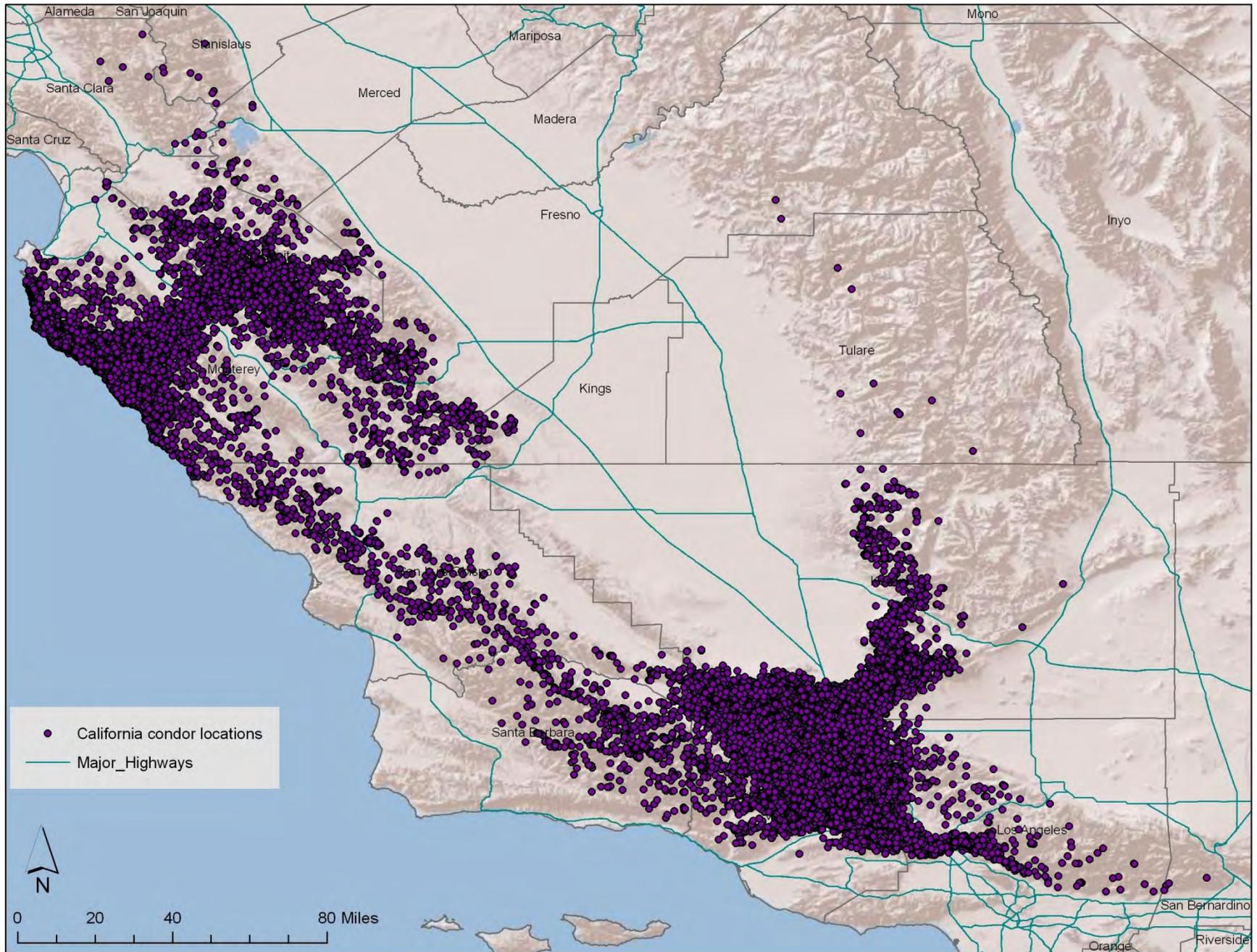
**Condors scheduled for release in 2011?**

**California-14**

**Grand Canyon-9**

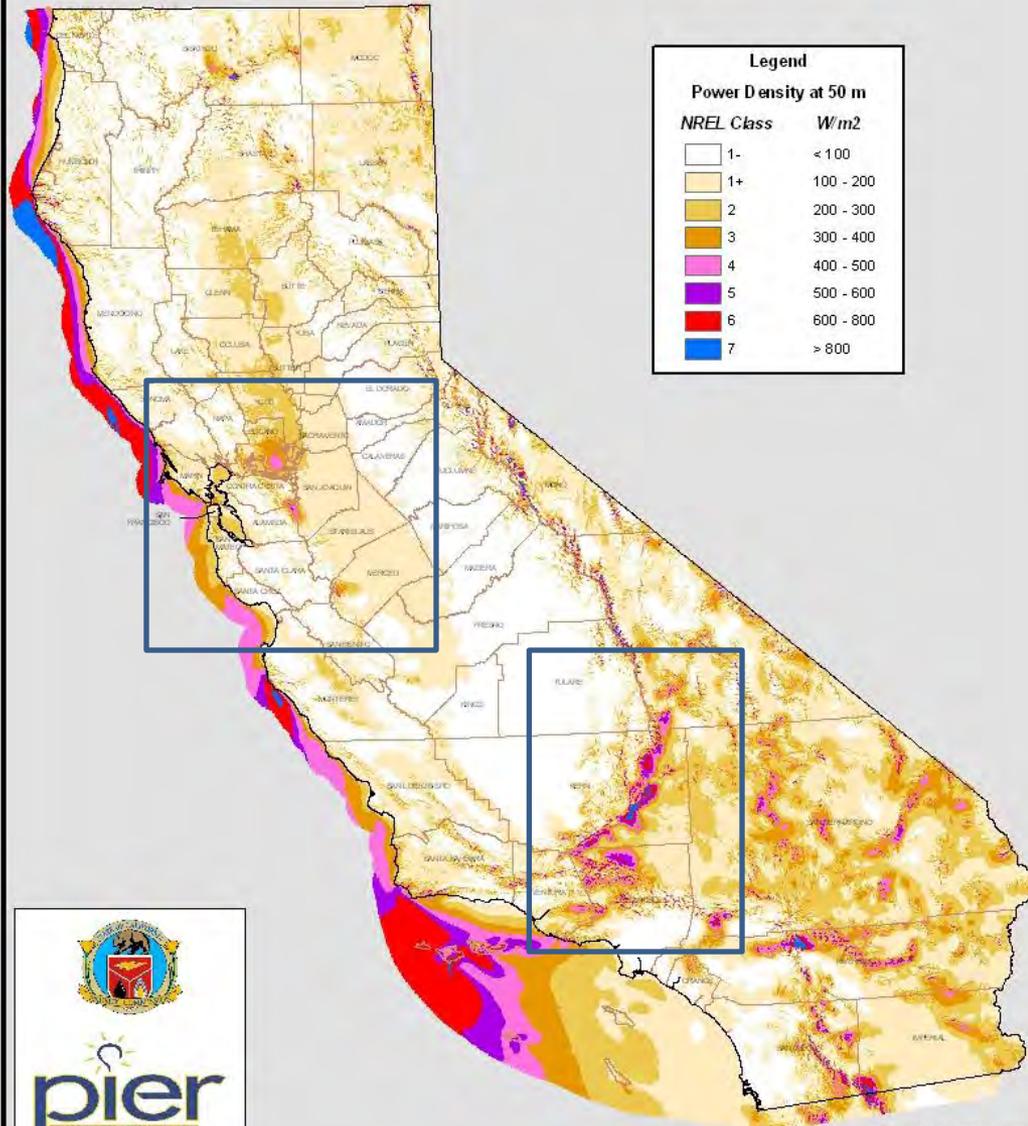
**Baja California-6**

# California Condor GPS Locations in California 2003- May 2011



# California Wind Resources

## Annual Wind Power at 50 Meter Elevation



This map was created by AWS TrueWind Solutions using the Mesomap system and historical weather data. Although it is believed to represent an accurate overall picture of the wind energy resource, estimates at any location should be confirmed by measurement. Data current 2006

Project: C:\Work\Special\Wind\2006\AWS\PIES\Map\WindPower\_50m\_Aug06.mxd

California Energy Commission  
Facilities Siting Division  
Cartography Unit  
[www.energy.ca.gov](http://www.energy.ca.gov)

To inquire about ordering this map or information on other types of maps, call the mapline at (916) 654-4122 or E-Mail: [JGLIBEA@ENERGY.STATE.CA.US](mailto:JGLIBEA@ENERGY.STATE.CA.US)

# Possible Conflicts

- Collision with blades
- Feeding event
- General development



*Surrogate species*

Mortality studies in Spain,  
Griffon vulture (*Gyps fulvus*)



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BIRDCAM 01

08/07/09 02:58 PM



BIRDCAM 01

08/07/09 03:05 PM



BIRDCAM 01

08/07/09 03:10 PM



BIRDCAM 01

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BIRDCAM 01

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BIRDCAM 01

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# Considerations for California condors and Wind Energy

- Where will the population expand?
- How will individuals interact with wind turbines in the landscape?
- Are there any methods to avoid or minimize the risk?

# California Condor Wind Energy Work Group

a recovery team for the California condor

## Members

- USFWS - Ecological Services and Condor Recovery Team
- Bureau of Land Management
- California Department of Fish and Game
- U.S. Forest Service
- California Public Utilities Commission
- California Audubon
- Wind Industry (CalWEA)

## Responsibilities

- 1) identify the behavioral and ecological aspects of California condor biology that may bring birds into conflict with existing and future wind development projects both now and as the species' range expands over time through the implementation of the recovery plan;
- 2) identify potential effects of wind farms on California condor recovery and conservation;
- 3) provide recommendations on and compile additional data layers appropriate to use in a GIS-based analysis of California condor movement, range expansion, and wind energy development;
- 4) identify how the risk to California condors can be minimized and/or avoided; and
- 5) provide recommendations to the Service regarding additional studies, monitoring, and analysis to further determine the risk to California condors associated with wind energy projects.

# U.S. Geological Survey Analysis and Modeling

- Analyze historic and current California condor space and habitat use
- Incorporates space and time- analyzing where birds move during the annual cycle and how they use the space
- Consider how California condor movement relates to existing wind energy sites, and proposed wind energy sites.



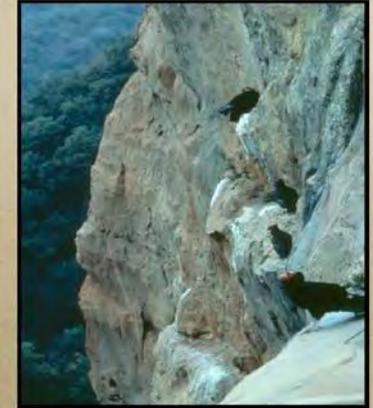
# Probability of Use Study

## elements of California condor habitat

Foraging sites



Roosting sites



Nesting sites



Threats



Why Move?  
 How to move?  
 Where to move?  
 Restrictions on movement?



## Resource Selection Theory

• Location data



■ Home range



■ Utilization distribution (likelihood of occurrence)



■ Resources within utilization distribution

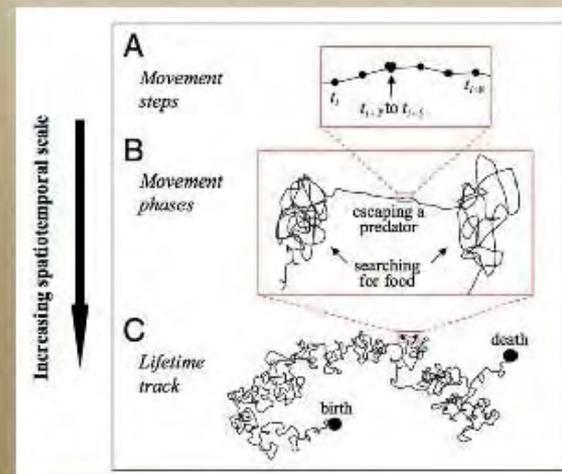


Relate utilization distribution to resources



Johnson et al. 2010

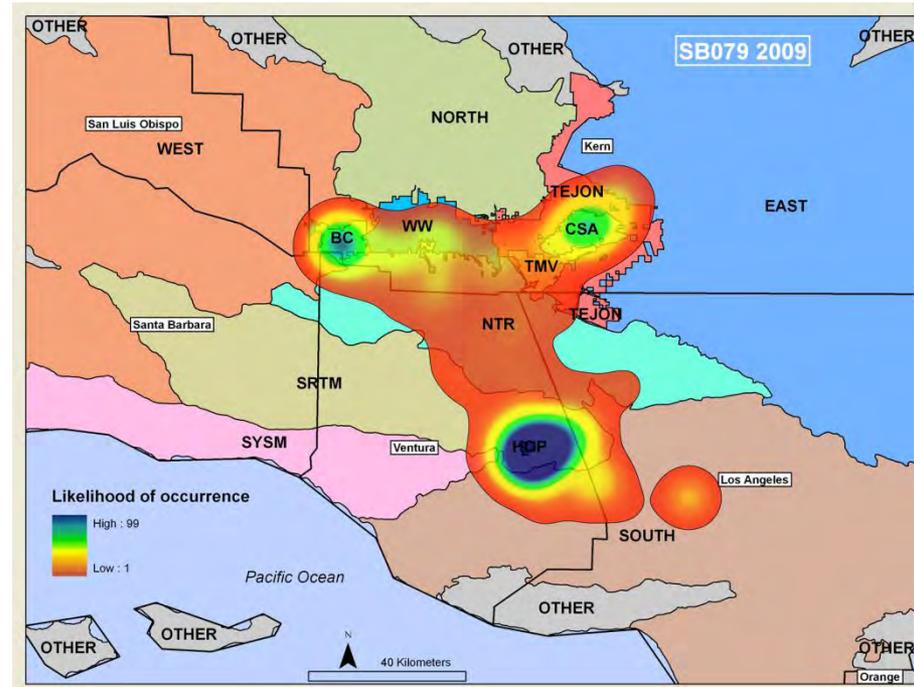
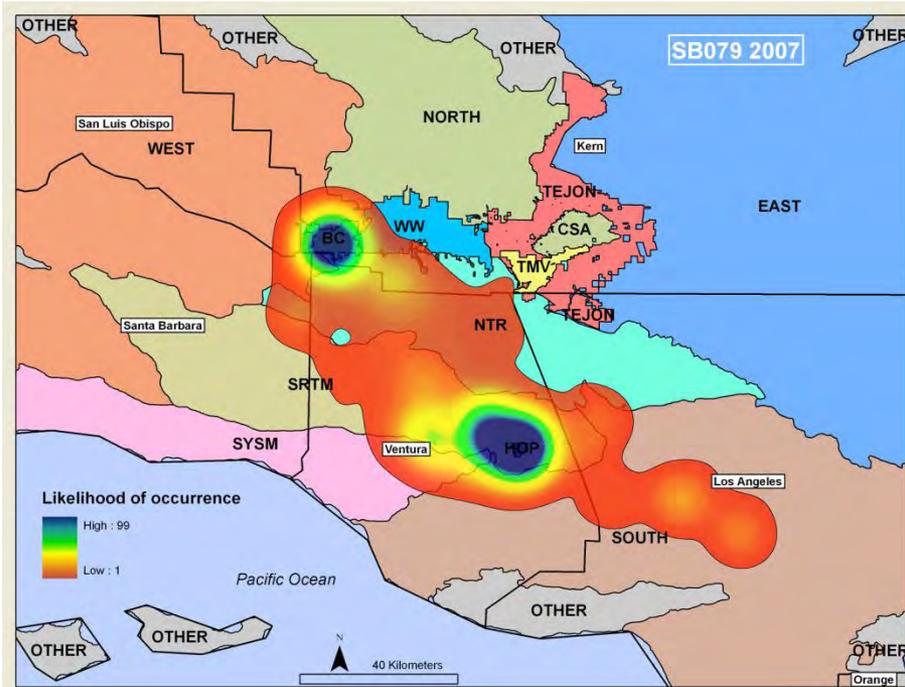
## Movement Ecology



Nathan et al. (2008)

- Temporal Scale
- Spatial scale

# Likelihood of Occurrence individual SB 79



Johnson, Matthew, Kern, Jeffrey, and Haig, S.M., 2010, Analysis of California Condor (*Gymnogyps californianus*) use of six management units using location data from global positioning system transmitters, southern California, 2004–09—Initial report: U.S. Geological Survey Open-File Report 2010-1287, 64 p.

# California Condor Wind Energy Work Group

## Product Timelines

### USGS:

- Map of California condor space use and movement patterns, including seasonal components
- Map throughout the historic range of the California condor that depicts the probability of California condor use based on current habitat use patterns.
- Report addressing the probability of California condor use based on current habitat use patterns in relation to wind development in California (Fall 2011 - Winter 2012)
- Peer-reviewed manuscript of analysis for publication in journals (Winter 2012)

Recommendations provided by Work Group to Regional Director (Winter 2012 and ongoing)



Questions?