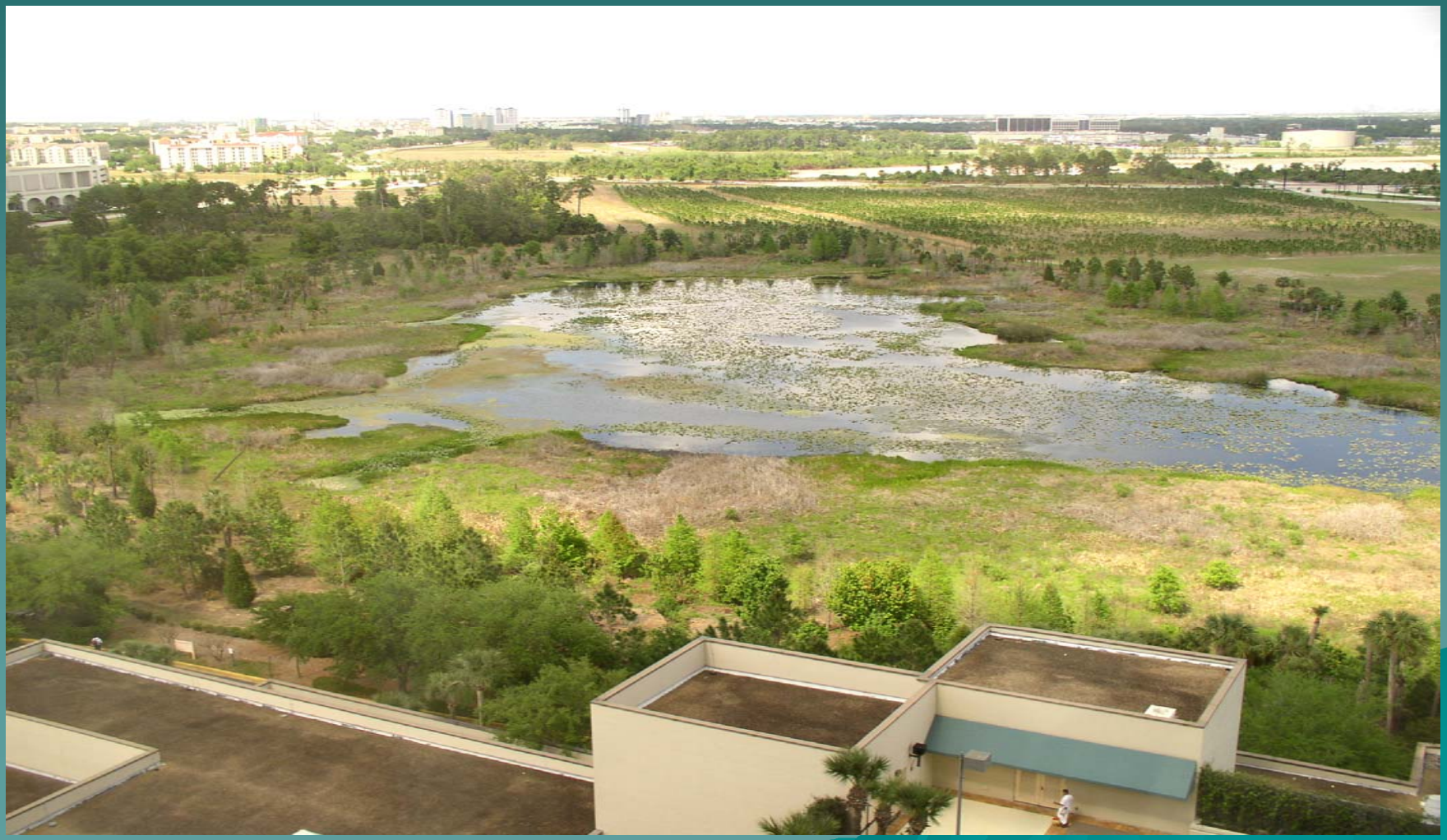
Highlights from the 2007 AMCA Meeting



AMCA Highlights

- Expect more reductions in federal WNV funds in 2008
- AMCA continues to lobby to maintain federal support as well as preserve mosquito control pesticides

AMCA Highlights

- WHO, CDC, and AMCA – supporting initiative to bring DDT back into use for malaria prev. in Africa
- <u>Indoor use</u> as a space spray to treat mosquito resting areas

Olyset® Bed Nets (J.R. Lucas et al)

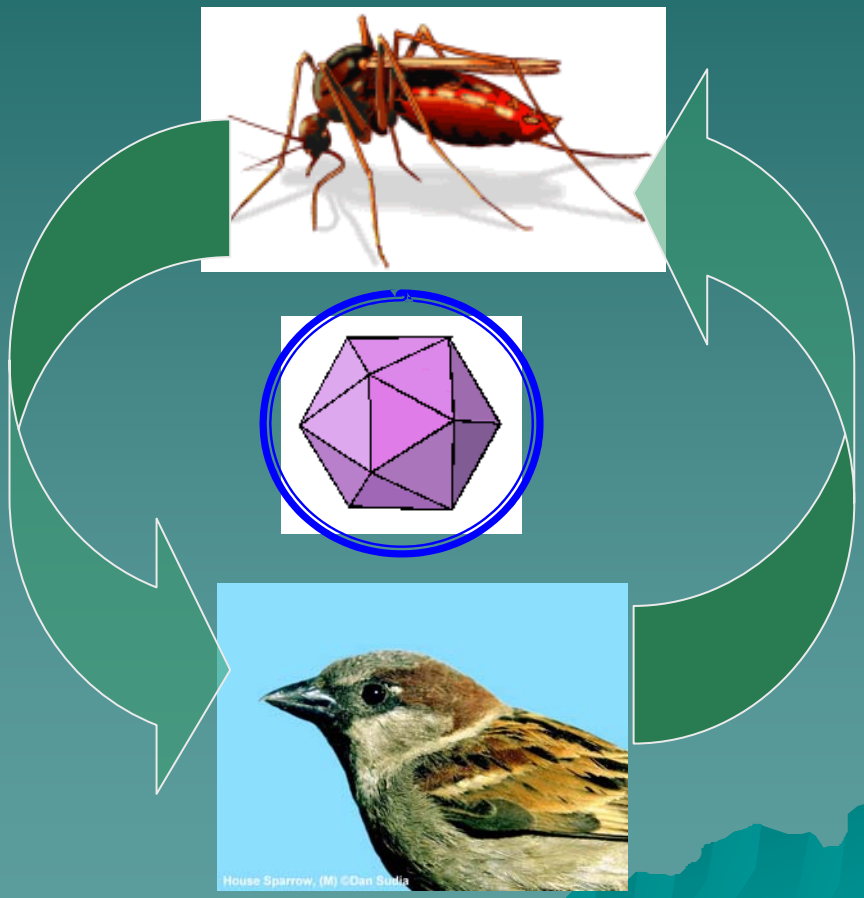
- Globally, there are 300 million new malaria cases reported each year.
- One million malaria deaths/year (that's over 2,800/day!) – mostly children.
- Permethrin impregnated bed-nets repel / kill blood seeking Anopheles.
- Olyset® Nets – polyethylene hollow fibers store pesticide longer term.
- Field trials – effective 5-7+ years!

Mosquito Host Preference Studies
(T.G. Andreadis, et al)

- Host preference studies in NE U.S. – testing blood meals, looking at genetic markers that show that mosquitoes selectively feed on certain animal hosts.
- *Aedes vexans* – 92% mammal hosts, w/ preference for white-tail deer
- *Culex pipiens*, *Cx. restuans* & *Culiseta melanura* – 90%+ birds
- Major preference for American Robins
- <u>But, ≤ 2% feeding on crows</u> !

Vector & Reservoir Cycle

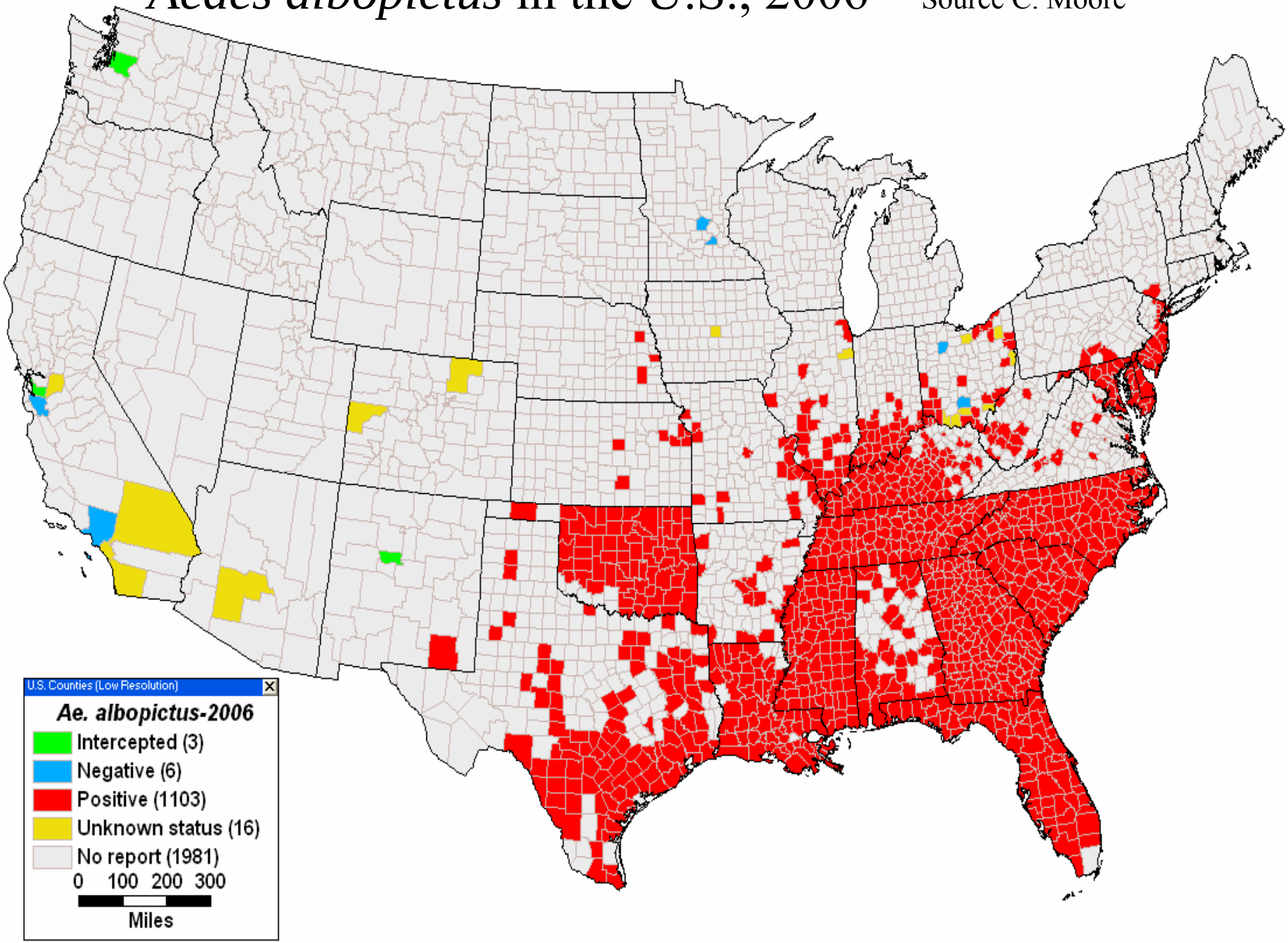
- Mosquito feeds on bird
- Virus replicates & infects tissues & blood
- Viremias rise over a few days & reach level of infectivity @ 4+ logs of virus
- Certain bird species (e.g. sparrows, finches) reach 10 logs



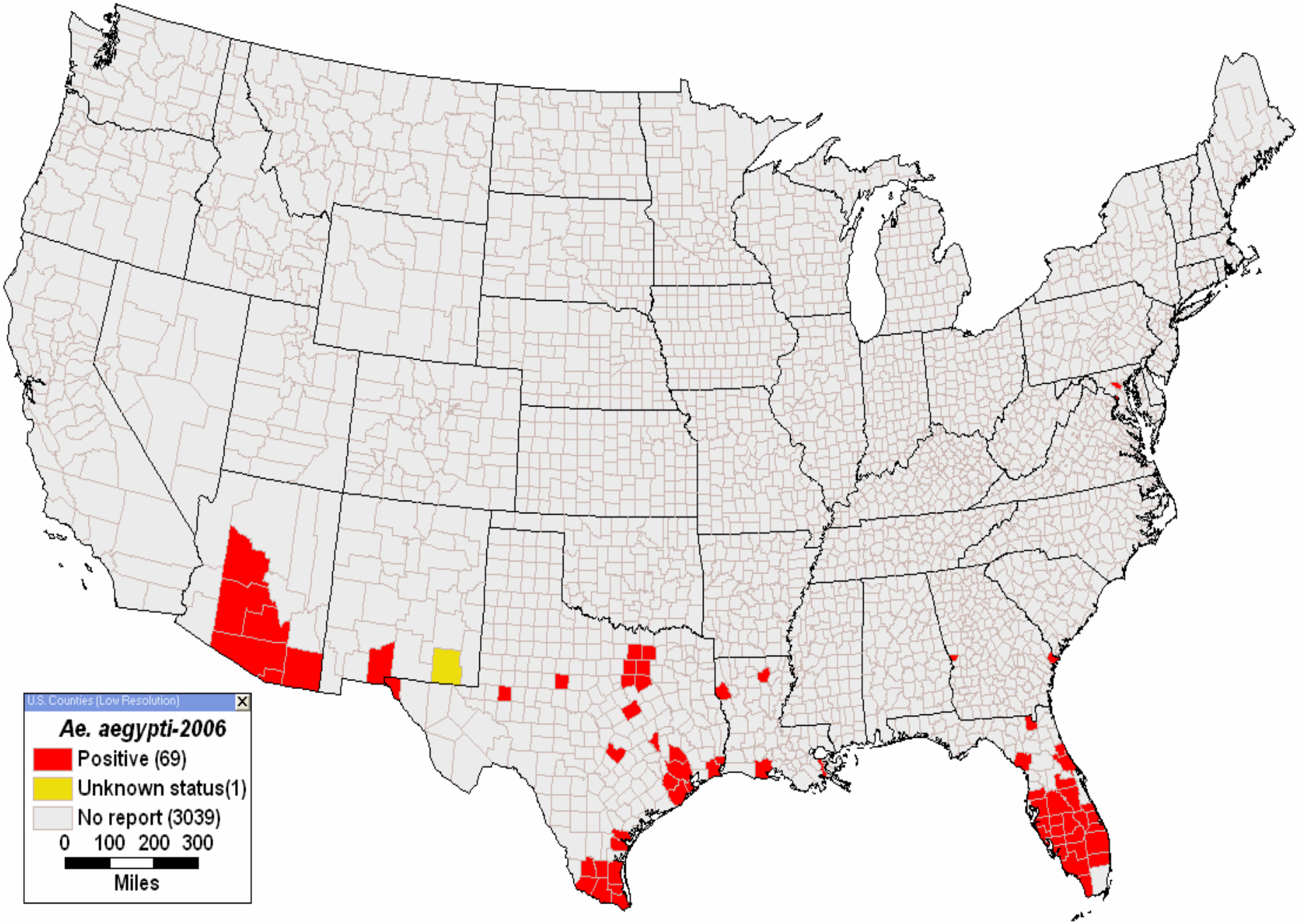
Non-Propagative WNV Viremias

- Wm. Reisen, et al – infectious female *Culex* mosquitoes feeding on small host (e.g. finch or sparrow) inoculated enough virus into host to create a non-propagative viremia (4.2 logs PFUs/ml) enough to infect other co-feeding mosquitoes.
- Virus load in host blood depends upon (1) amt. Virus expectorated, & (2) size/blood volume of host.

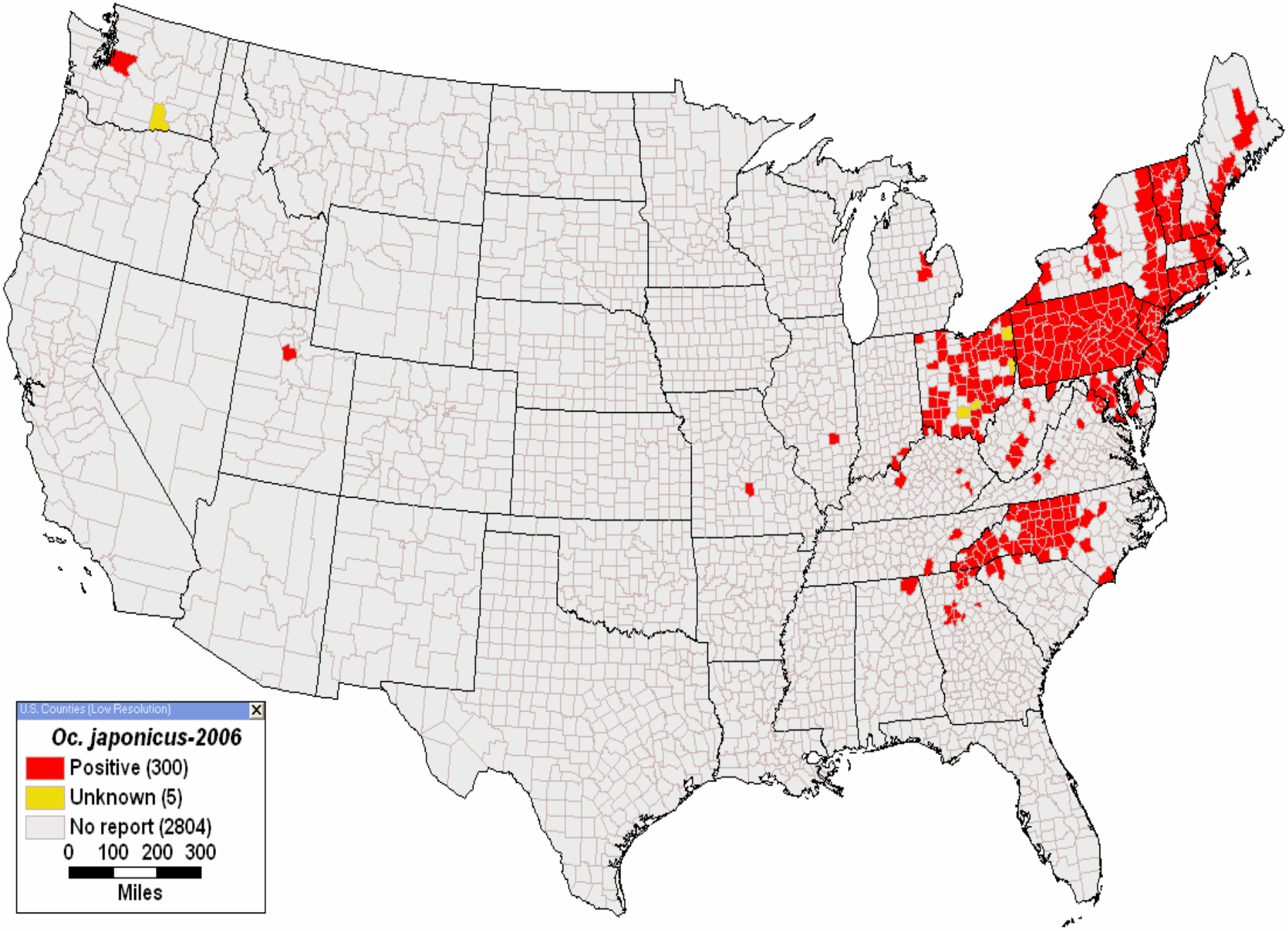
Aedes albopictus in the U.S., 2006 – Source C. Moore



Aedes aegypti in the U.S., 2006 – Source C. Moore



Ochlerotatus j. japonicus in the U.S., 2006 – Source C. Moore



Mobile Sentinel Chicken Flocks

Non-target Affects of VC

Adulticide & Barrier Spray: Non-target affects: *Bad News* (N. Read)

- Major monarch kill due to VC in MN
- Monarch butterfly larvae feed on milkweed
- Permethrin barrier treatments applied to milkweed caused caterpillar mortality up to 21 days
- Also, Resmethrin ULV fog (0.0035 lbs AI/acre) caused short term mortality
- @ 24 hours later – sunlight exposed plants were no longer toxic to larvae

Adulticide & Monarch Butterflies Good News (N. Read, et al)

- Studies conducted in MN to see how much spatial overlap occurred between milkweed habitats and VC treated areas
- 0.22% milkweed habitats were treated w/ permethrin
- 0.52% milkweed habitats were fogged w/ Resmethrin or Sumithrin

Non-Target Affects of Oils (H. Zhong)

- Mosquito larviciding oil (Agnique MMF®) – reduces surface tension of water. Non-petroleum based – relatively non-toxic.

- Affected populations of water boatmen when applied @ max rate. Caused mortality in boatman for several days.
- Mortality stopped after about 1 week
- Boatman #'s rebounded quickly.

Vector-Borne Disease Update

- Dengue
- Malaria
- Lyme disease
- RMSF
- Hantavirus

Dengue

- 10 cases of imported dengue in 2006
- Arizona residents w/ travel to Mexico (1), Cambodia (1), Dom. Rep. (8)*
- 8 cases* associated w/ church group that traveled together - 100% became infected.
- *Ae. aegypti* mosquitoes (dengue vector) are prevalent in 6 counties.
- 2007: Pima Co. (1)- tvl to Dom. Rep.

Malaria Cases, AZ 2006 (Imported)

- **Total = 23 Cases**
- **Ages: 16 – 75**
- **M – 17, F - 6**
- **County / Residence**
- **Apache -1**
- **Coconino - 1**
- **Maricopa – 17**
- **Pima – 3**
- **Yavapai - 1**

- **Plasmodium Sp.**
- ***P. falciparum* – 16**
- ***P. vivax* – 6**
- ***P. malariae* – 1**
- **Continents/Travel**
- **Africa – 16**
- **So. America – 3**
- **India – 1**
- **Unknown - 3**

Lyme Disease, AZ 2006

- **Total = 10**
- **Ages 24-75 yrs**
- **M = 4 / F = 6**
- **<u>County / Residence</u>**
- **Coconino – 1**
- **Maricopa – 5**
- **Pima – 2**
- **Pinal - 2**

- **<u>Travel/Exposure</u>**
- **Wisconsin – 3**
- **Minnesota – 1**
- **New York - 1**
- **Illinois - 1**
- **Missouri – 1**
- **Oregon – 1**
- **Unknown -2**

ROCKY MOUNTAIN SPOTTED FEVER

Rocky Mountain Spotted Fever, Arizona 2006

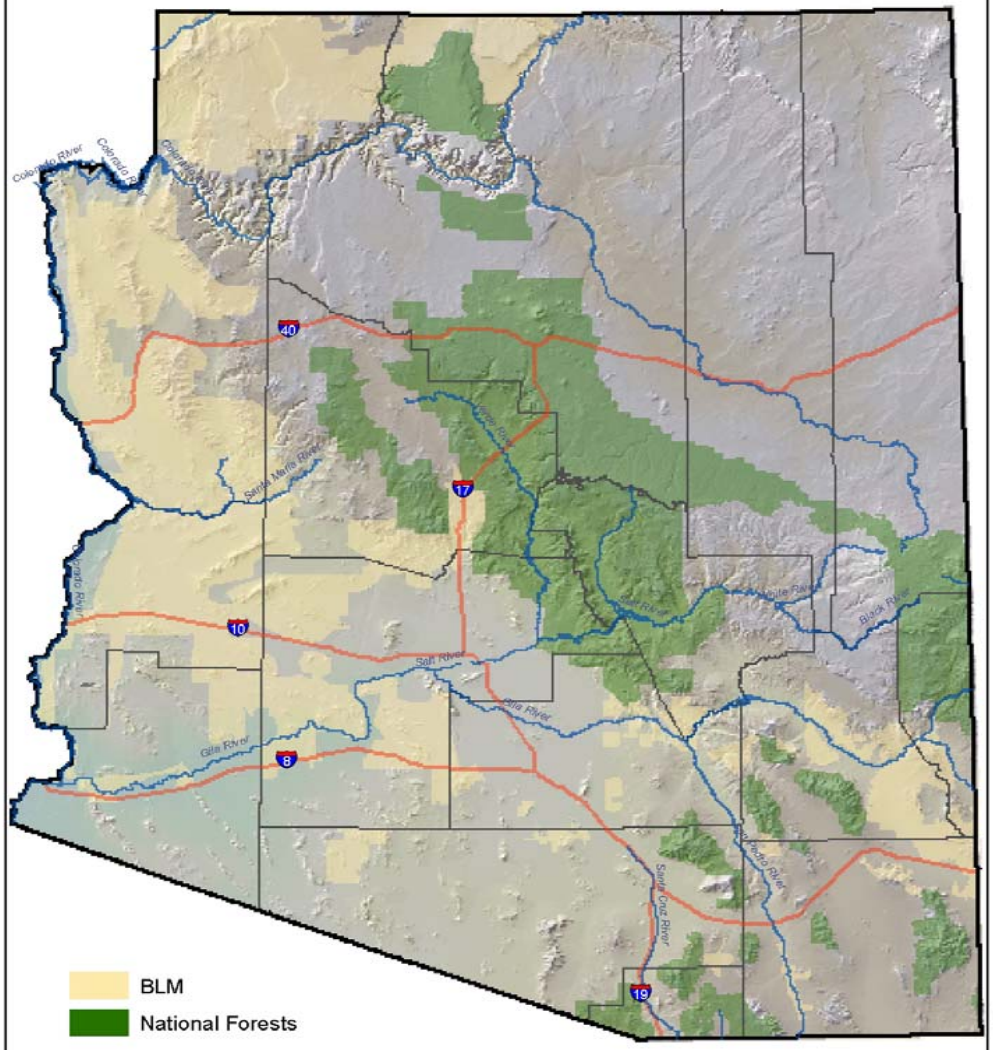
- **Total = 10 cases**
- **Ages: < 1 – 46 yrs**
- **Median Age = 12 yrs**
- **M = 7, F = 3**
- **Kids - 5, Adults - 5**
- **<u>County/Residence</u>**
- **Navajo – 5**
- **Gila – 2**
- **Maricopa – 2**
- **Pinal - 1**

- **<u>Travel/Exposure</u>**
- **7 cases acquired in eastern Arizona**
- **2 cases - out-of-state travel**
- **1 case – out-of-country**

RMSF Case Update Eastern AZ

- 47 RMSF cases reported in the White Mountains Region during 2002-2006
- Cases occuring in communities with lots of stray dogs & ticks
- 6 cases were fatal (2 kids, 4 adults)
- Age range: < 1 year – 68 years
- 29 cases (62%) – kids ≤ 12 years
- 7 of these RMSF cases - 2006

ARIZONA



Arizona Department of Health Services
Office of Infectious Diseases Services
Sources: ESRI Shapefiles
ALRIS Shapefiles
April 2005

Arizona Department of Health Services

Protect Your Family From Rocky Mountain Spotted Fever!

Get Rid of Ticks on People

When you are outside or touching dogs you might get a tick. After you come inside check your body and your child's body for ticks and take them off.

Get Rid of Ticks in Your Yard

Ticks live in the things you leave outside such as old mattresses. Don't give ticks a home. Take trash and old mattresses from your yard to the landfill. Some yards may also need treatment with a chemical that kills ticks.

Contact a Doctor or Nurse

Rocky Mountain spotted fever is a disease that is spread by ticks. A person who has Rocky Mountain spotted fever would have a fever and sometimes a rash.

Call your doctor or public health nurse if you or your child:

- Get a fever or rash

AND

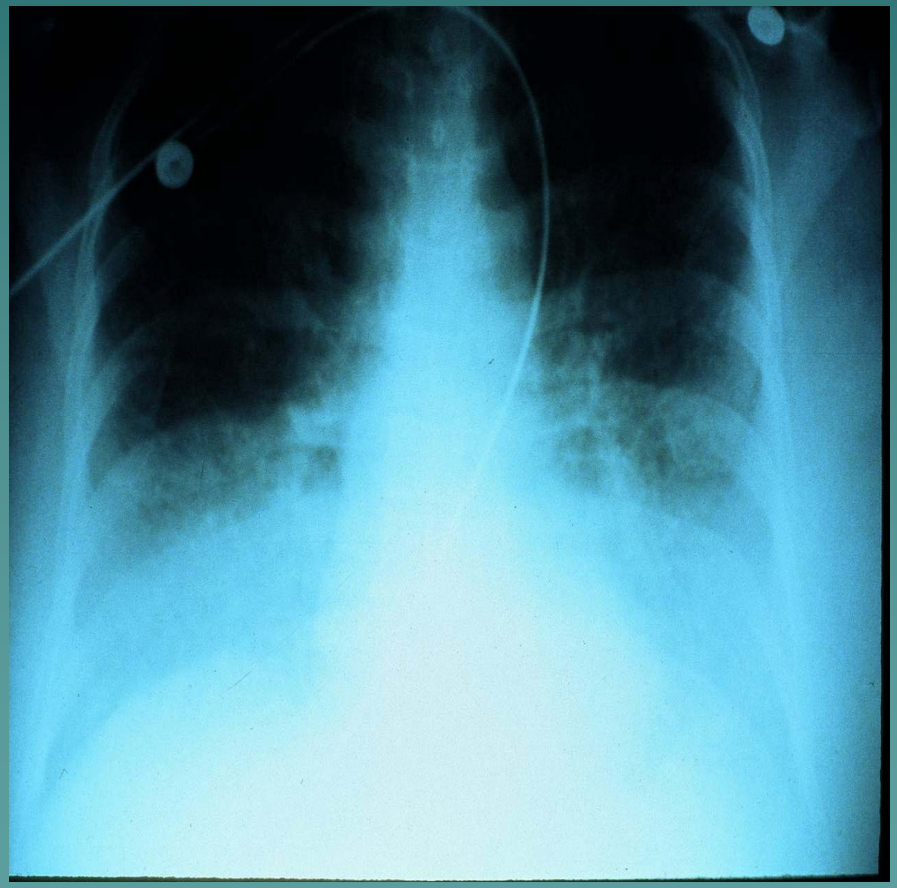
- Have been outside or touching dogs

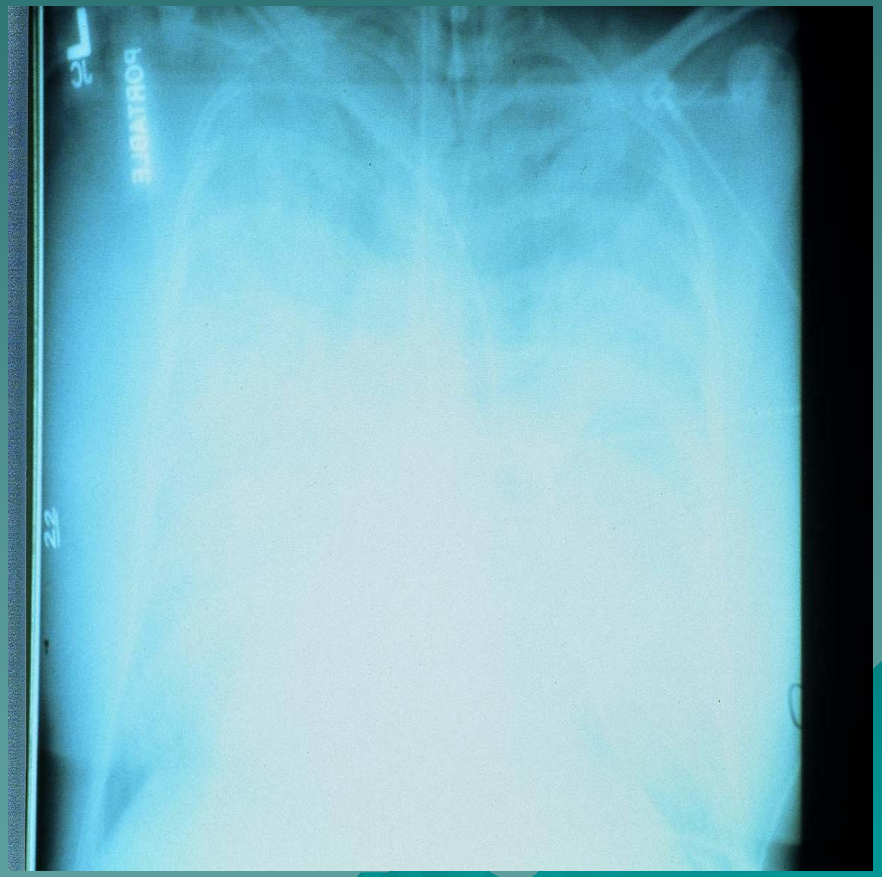
CDC

For more information on Rocky Mountain spotted fever:
San Carlos Health Department: (928) 475-2798
Indian Health Services- Office of Environmental Health: (928) 475-7213

Hantavirus Pulmonary Syndrome

Arizona Sets New Record in 2006





HPS Cases in Arizona, 2006

COUNTY	# CASES	# FATAL
Apache	3	---
La Paz	1	1
Maricopa	3	2
Navajo	6	2
TOTAL	13	5

HPS Cases in Arizona, 2006

- Age range: 16 – 60 years
- Race/ethnicity:
  - White (non-hispanic) – 4
  - Native American – 7
  - African American – 1
  - Hispanic - 1
- Sex: 9 males, 4 females

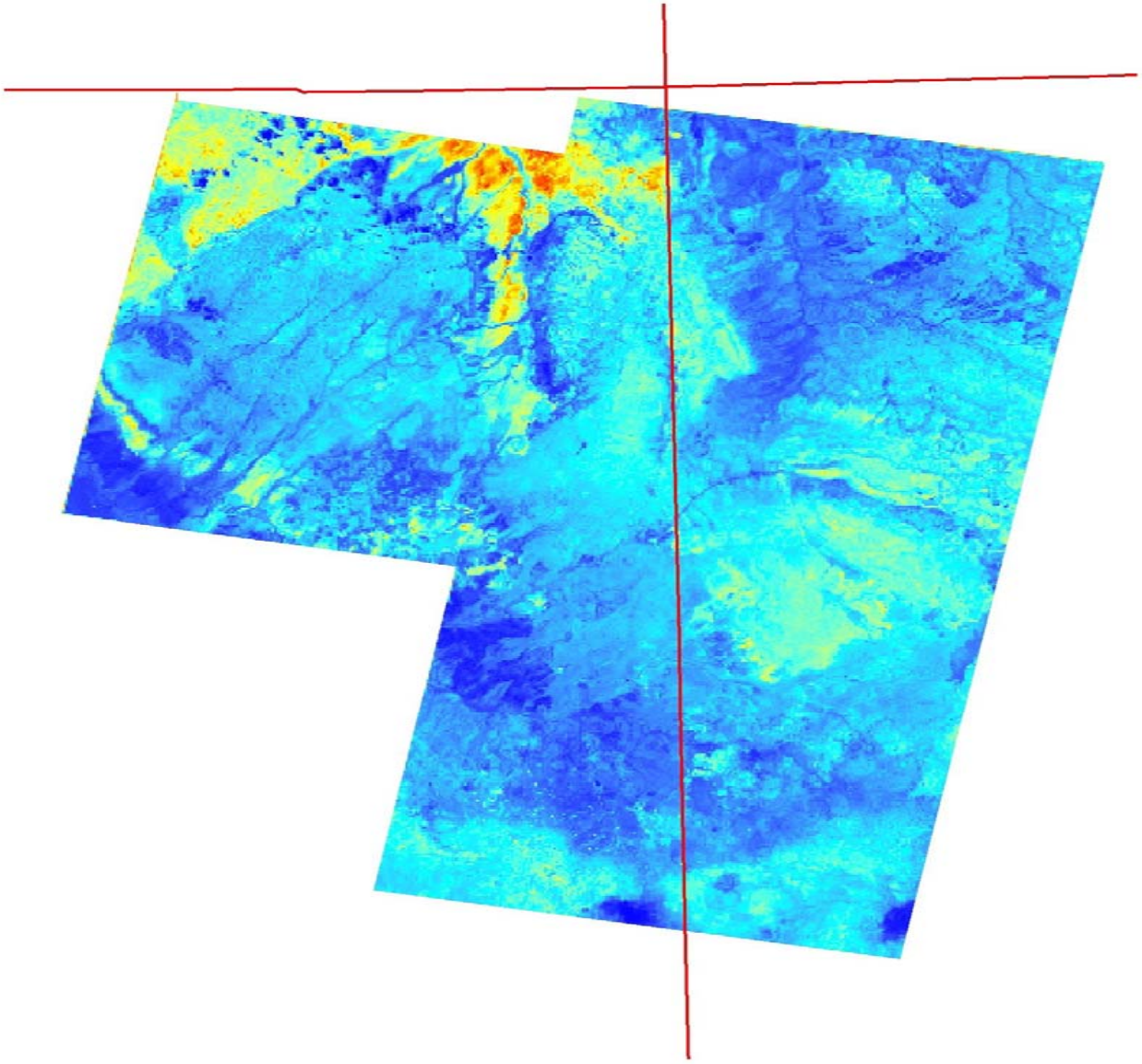
Mouse Forecast ?

Hantavirus Predictions

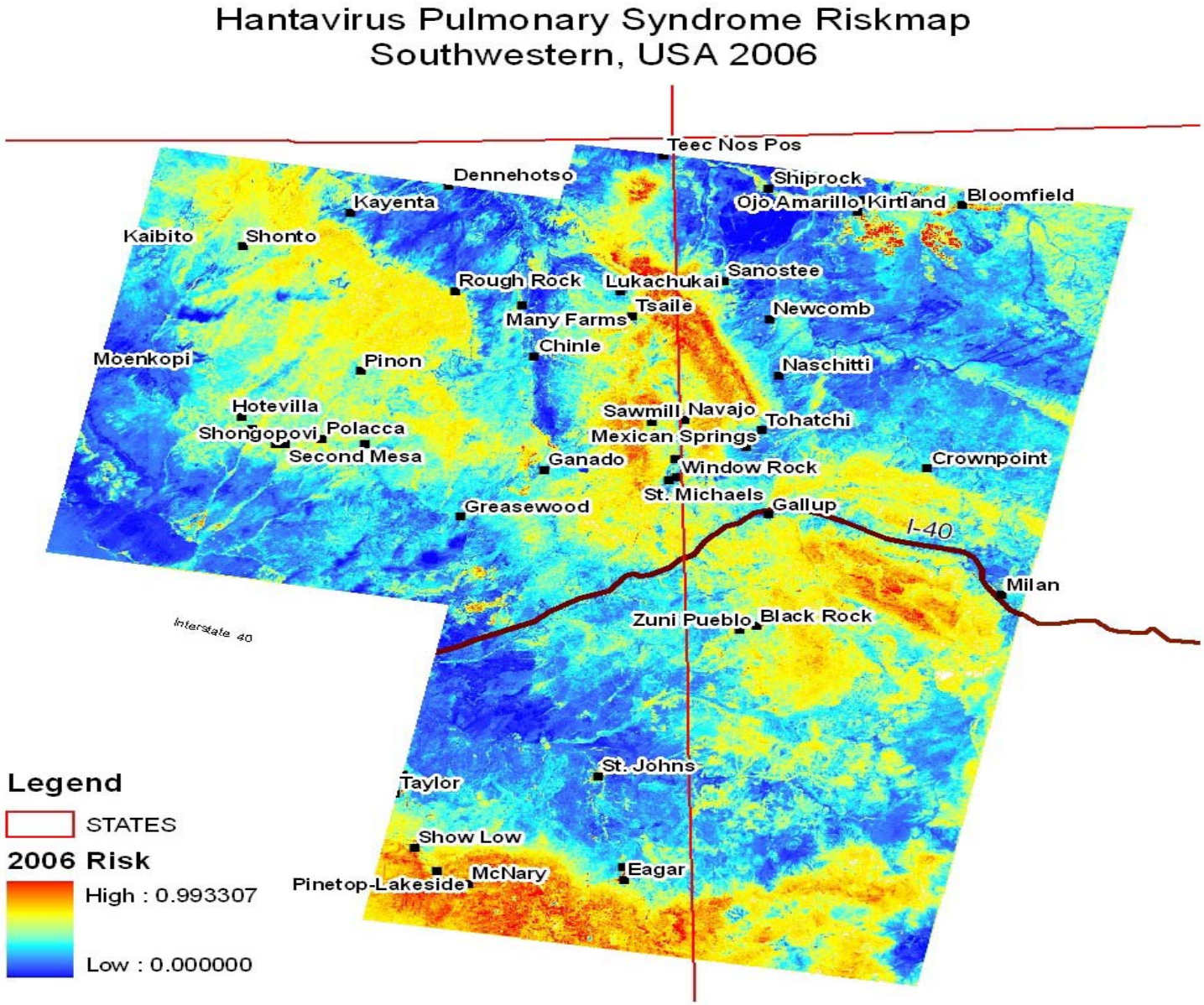
- Wet winter/spring 2004-2005
- *Peromyscus* mouse populations started rising in 2005 and cont. into 2006.
- ASU rodent trapping studies in central AZ showed highest mouse catches since early 1990's
- El Nino pattern predicts above average rainfall likely for winter/spring 2007.
- Increased/sustained hantavirus risk.

Remote Sensing Image, 2004 Four Corners Region –

source G. Glass, Johns Hopkins School of Public Health



Remote Sensing Image, Four Corners Region 2006-2007 – source G. Glass, Johns Hopkins School of PH



HPS Cases, 2007

- Two cases of HPS reported in 2007
- Both were fatal
- Pinal Co. - adult male - March
- Apache Co. – teenage girl – April

HPS Lab Diagnosis

- NOTE: IgM assays at commercial labs have produced frequent false positive results**
- *60+ false positives reported 2006!
- Commercial labs = "screening test"
- Confirmation rec. - State Lab, CDC or Tricor Lab, NM
- ↓ platelets = reliable indicator/screen

Questions?