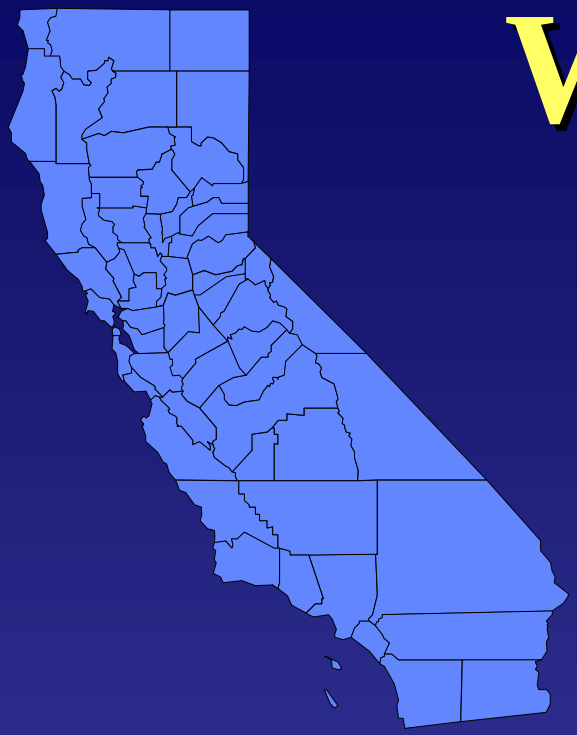
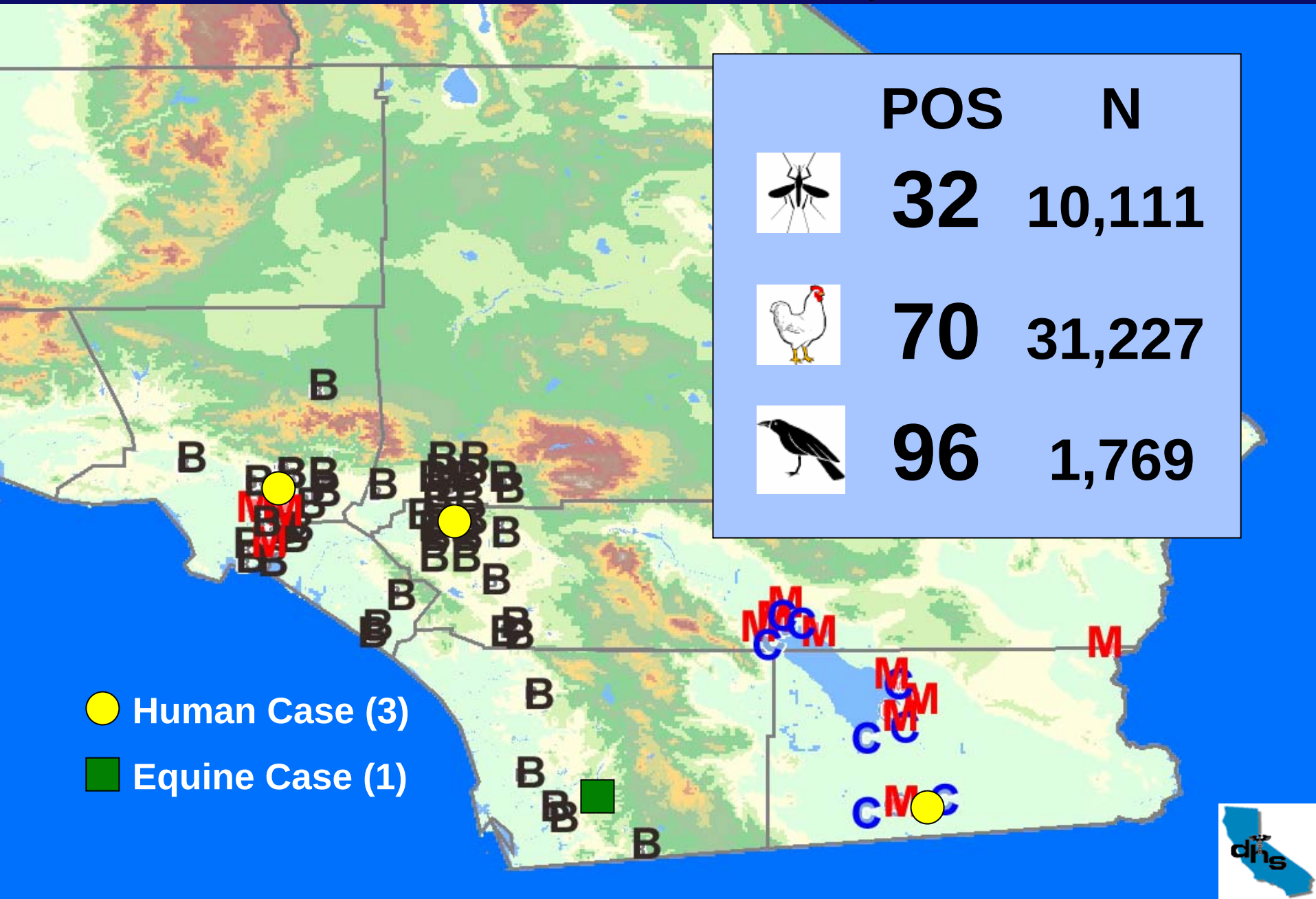


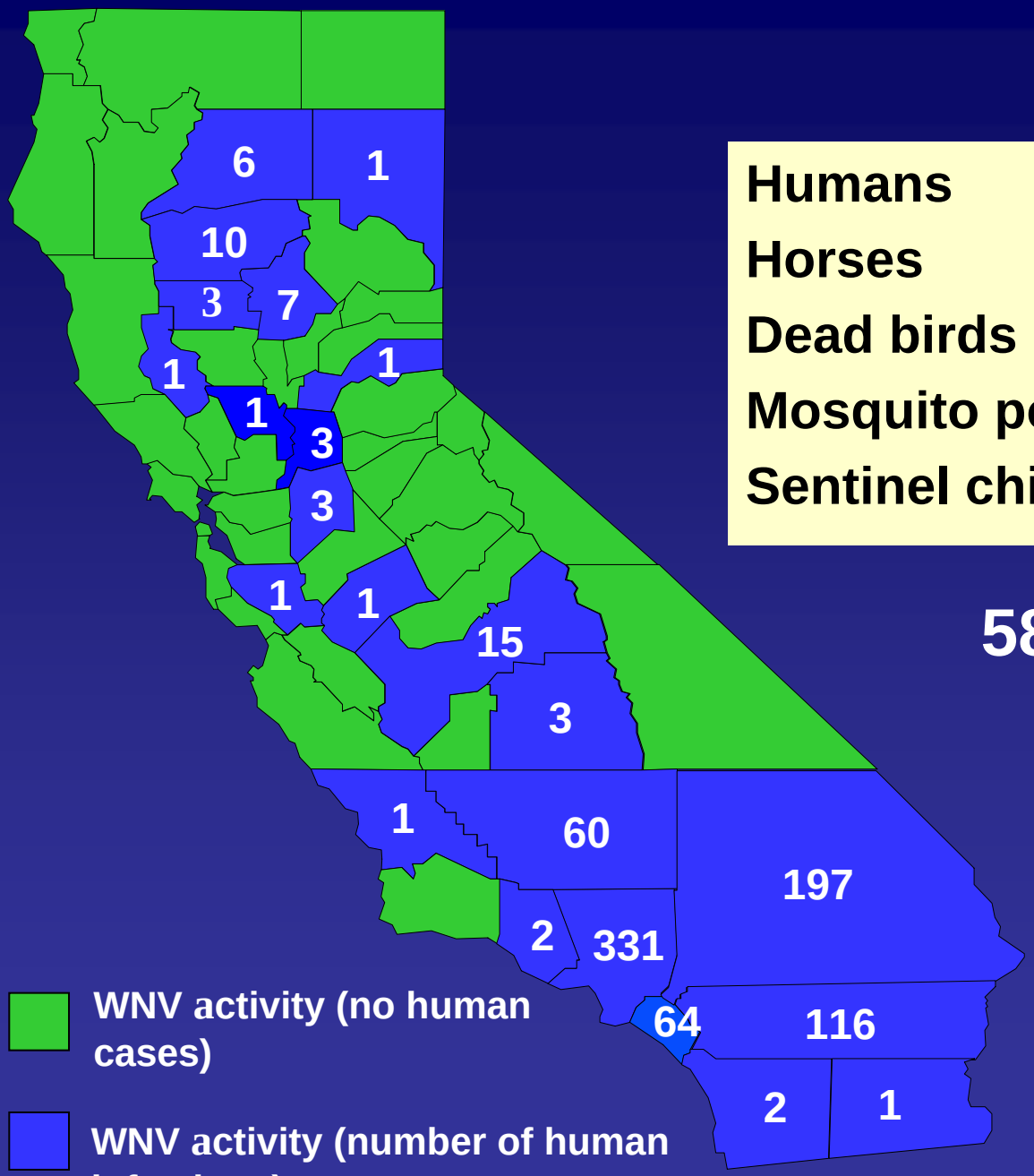
West Nile Virus Activity in California 2005

Division of Communicable Disease Control
California Department of Health Services

WNV in California, 2003



2004



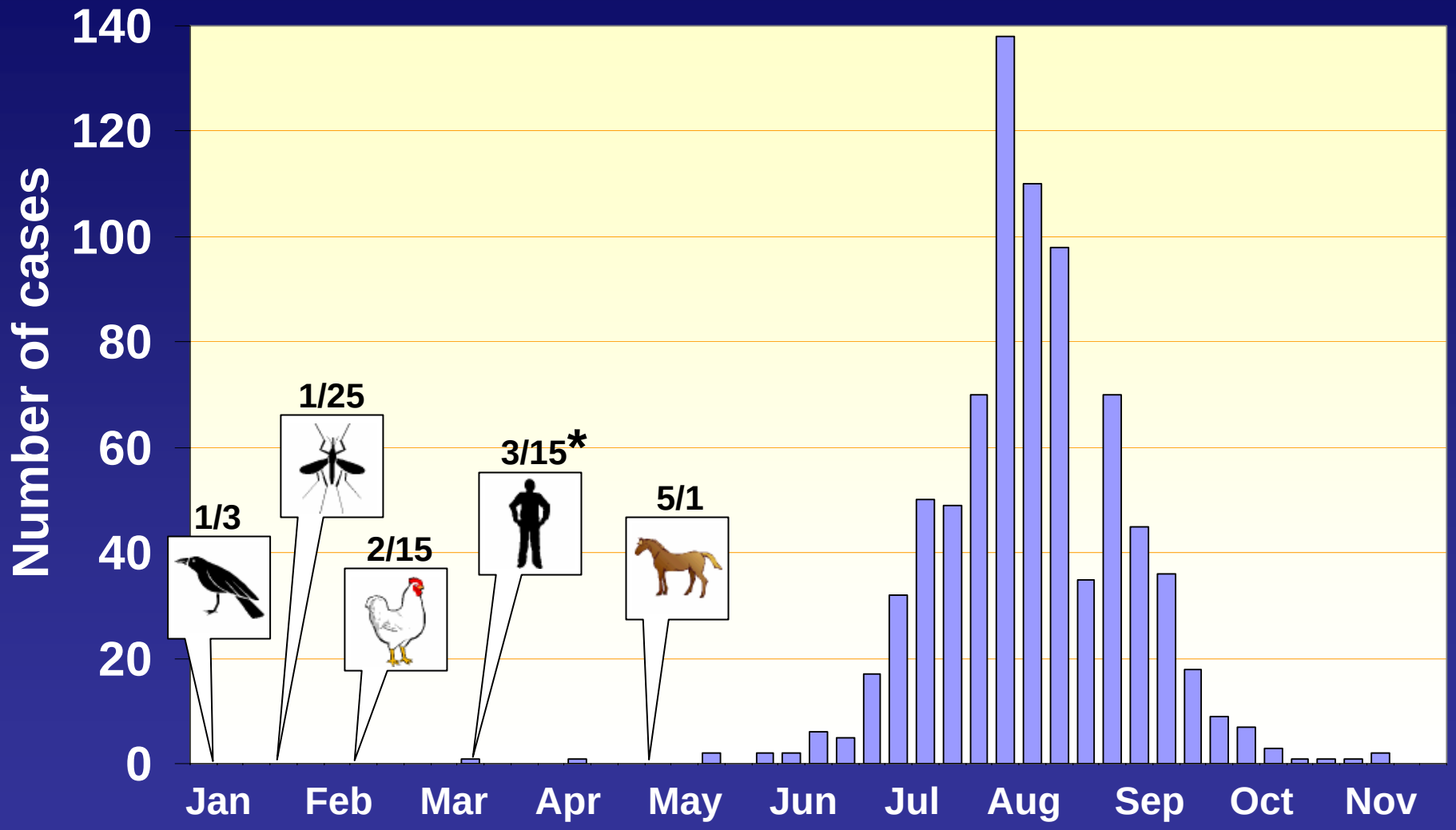
Humans	830 / 28
Horses	540 / 230
Dead birds	3232
Mosquito pools	1136
Sentinel chickens	805

58 counties

WNV activity (no human cases)

WNV activity (number of human infections)

Sequence of WNV detection events in California relative to human case onset, 2005

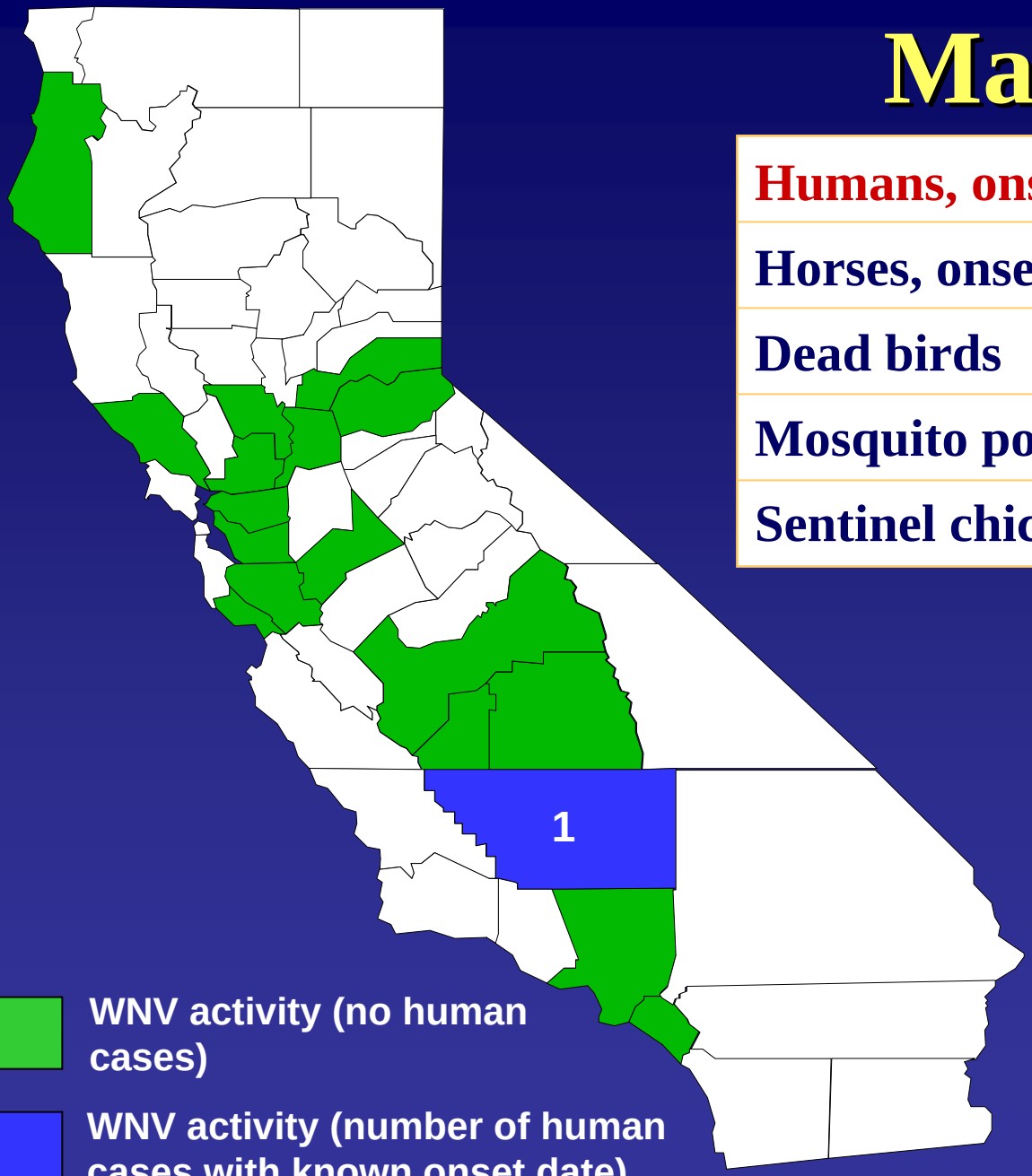


- Onset dates not available for all patients
- Birds, mosquitoes: date of collection
- Chickens: date of probable seroconversion

* Estimated date of onset

March 2005

Humans, onset / reported	1 / 0
Horses, onset / reported	0
Dead birds	57
Mosquito pools	1
Sentinel chickens	1



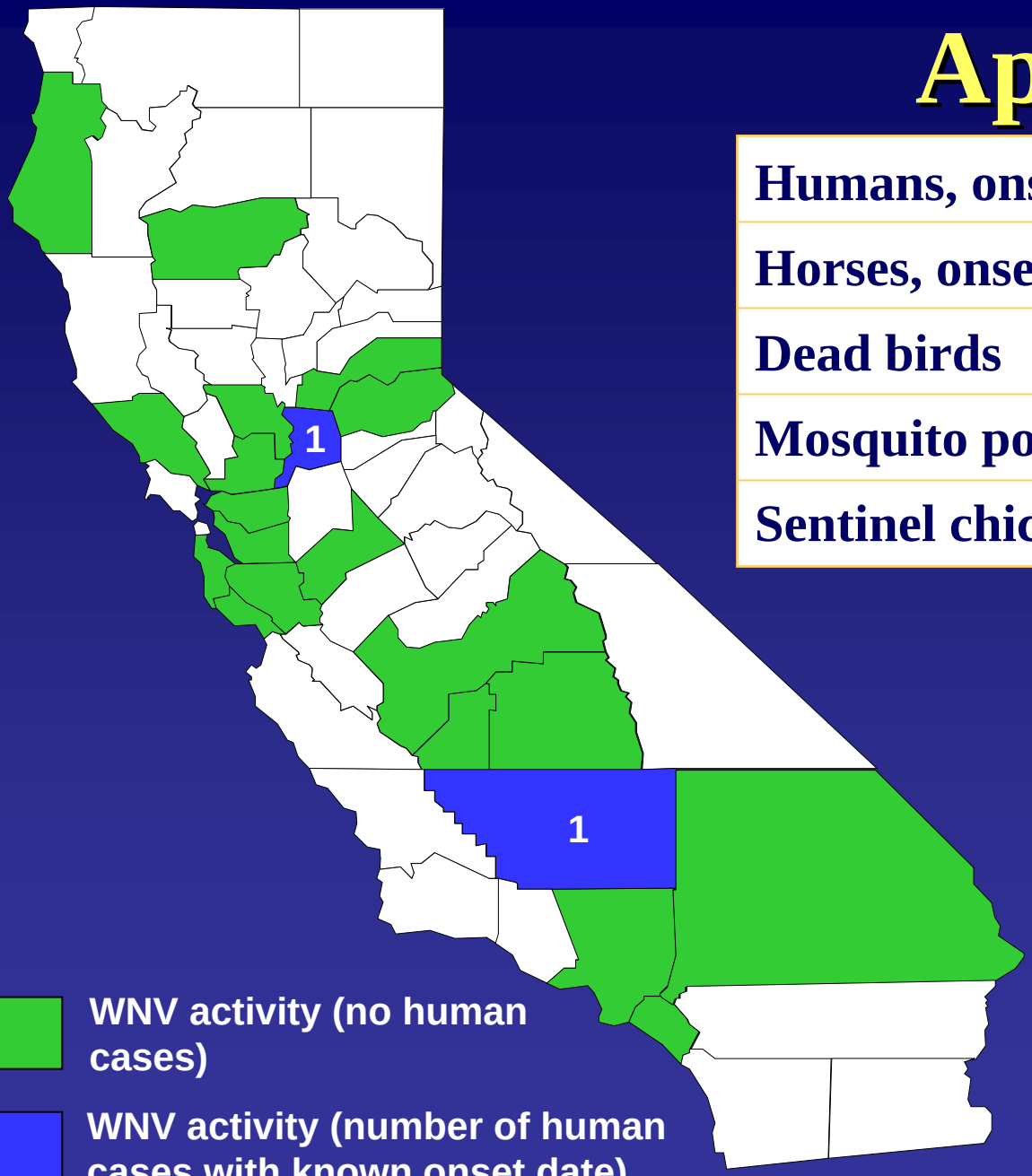
N = 1 county with human infection

WNV activity (no human cases)

WNV activity (number of human cases with known onset date)

April 2005

Humans, onset / reported	2 / 0
Horses, onset / reported	0
Dead birds	63
Mosquito pools	1
Sentinel chickens	1



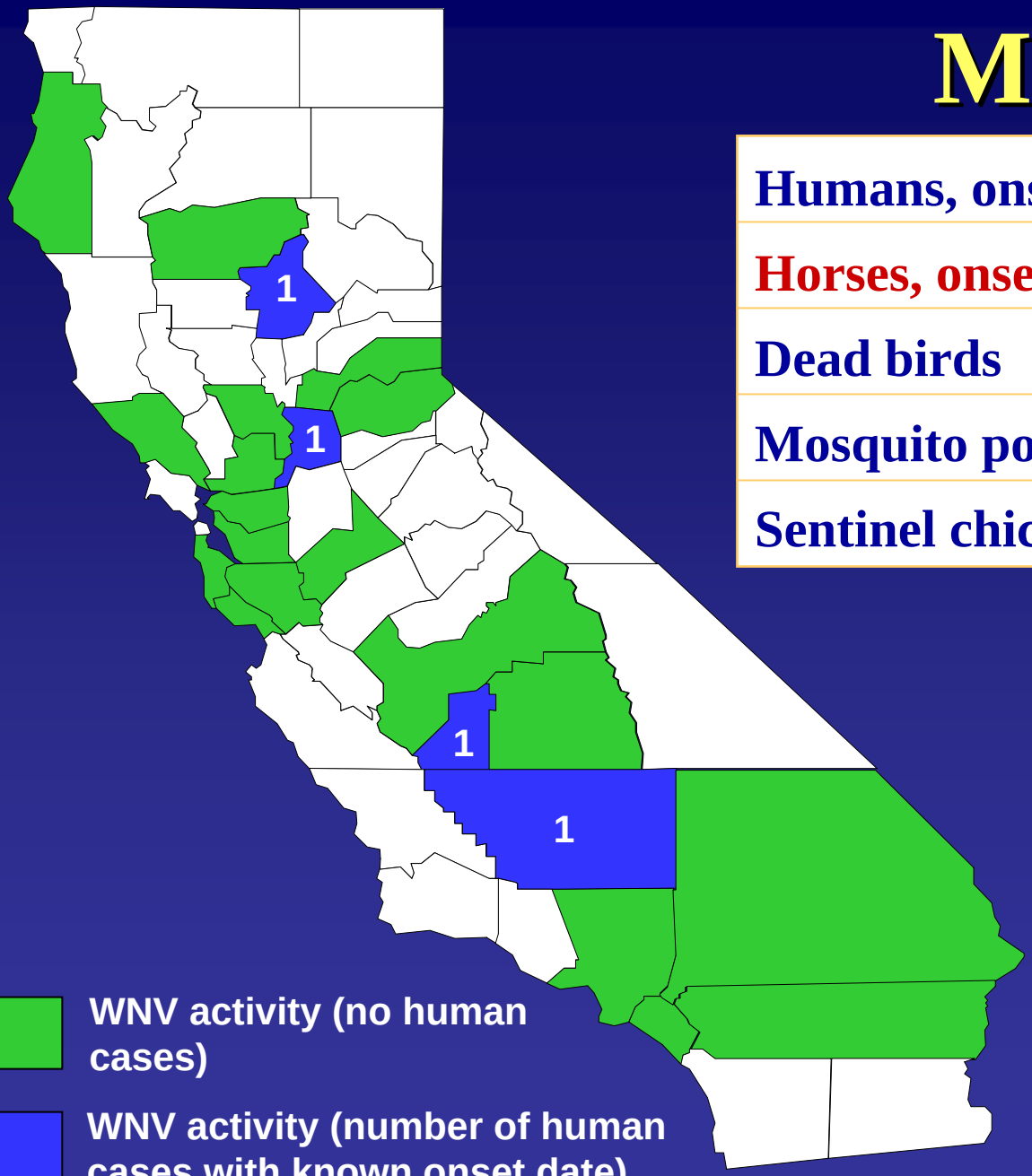
N = 2 counties with human infection

WNV activity (no human cases)

WNV activity (number of human cases with known onset date)

May 2005

Humans, onset / reported	4 / 0
Horses, onset / reported	1 / 1
Dead birds	101
Mosquito pools	6
Sentinel chickens	3

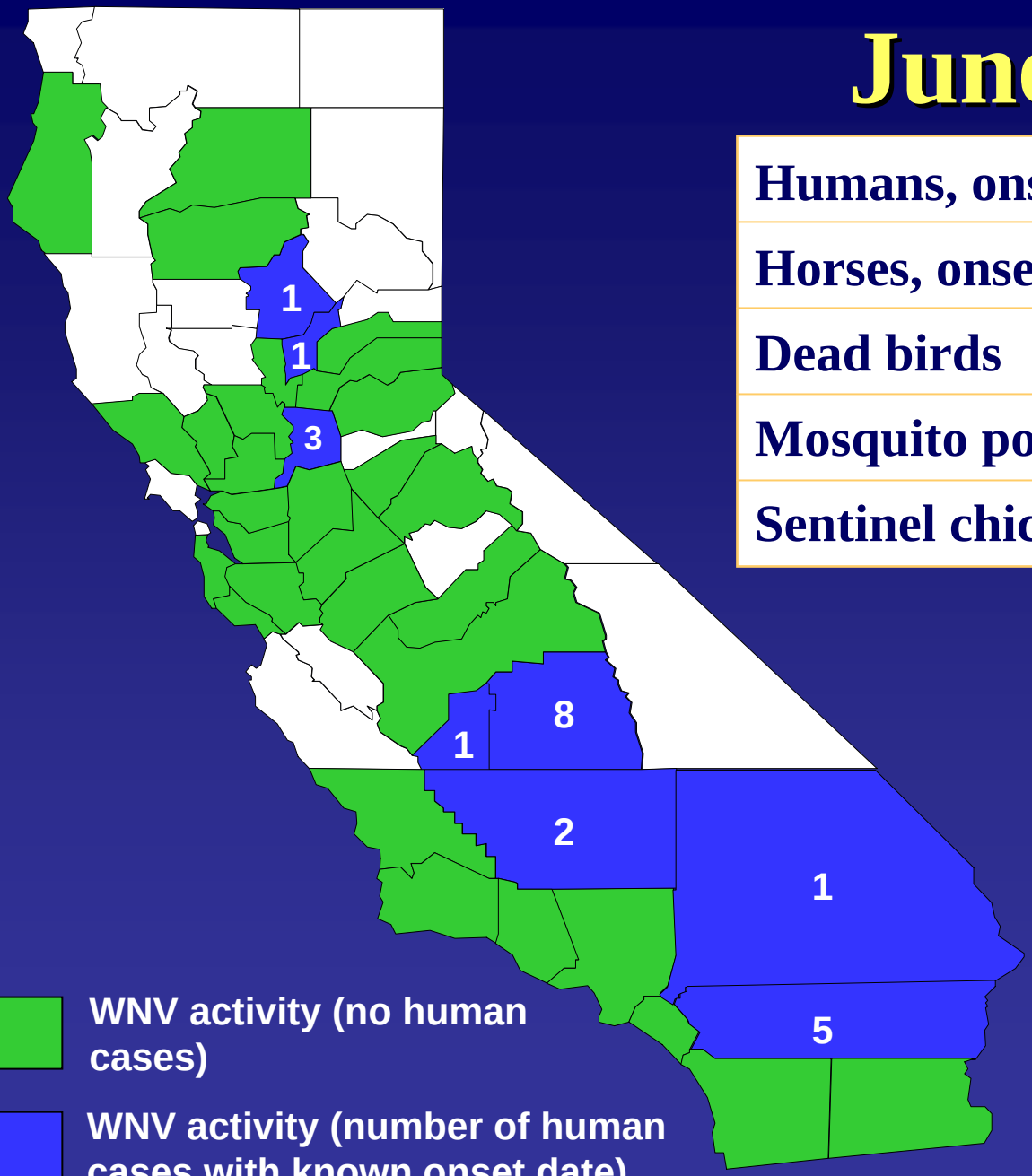


N = 4 counties with human infection

WNV activity (no human cases)

WNV activity (number of human cases with known onset date)

June 30, 2005



Humans, onset / reported	22/ 2
Horses, onset / reported	8 / 3
Dead birds	437
Mosquito pools	137
Sentinel chickens	14

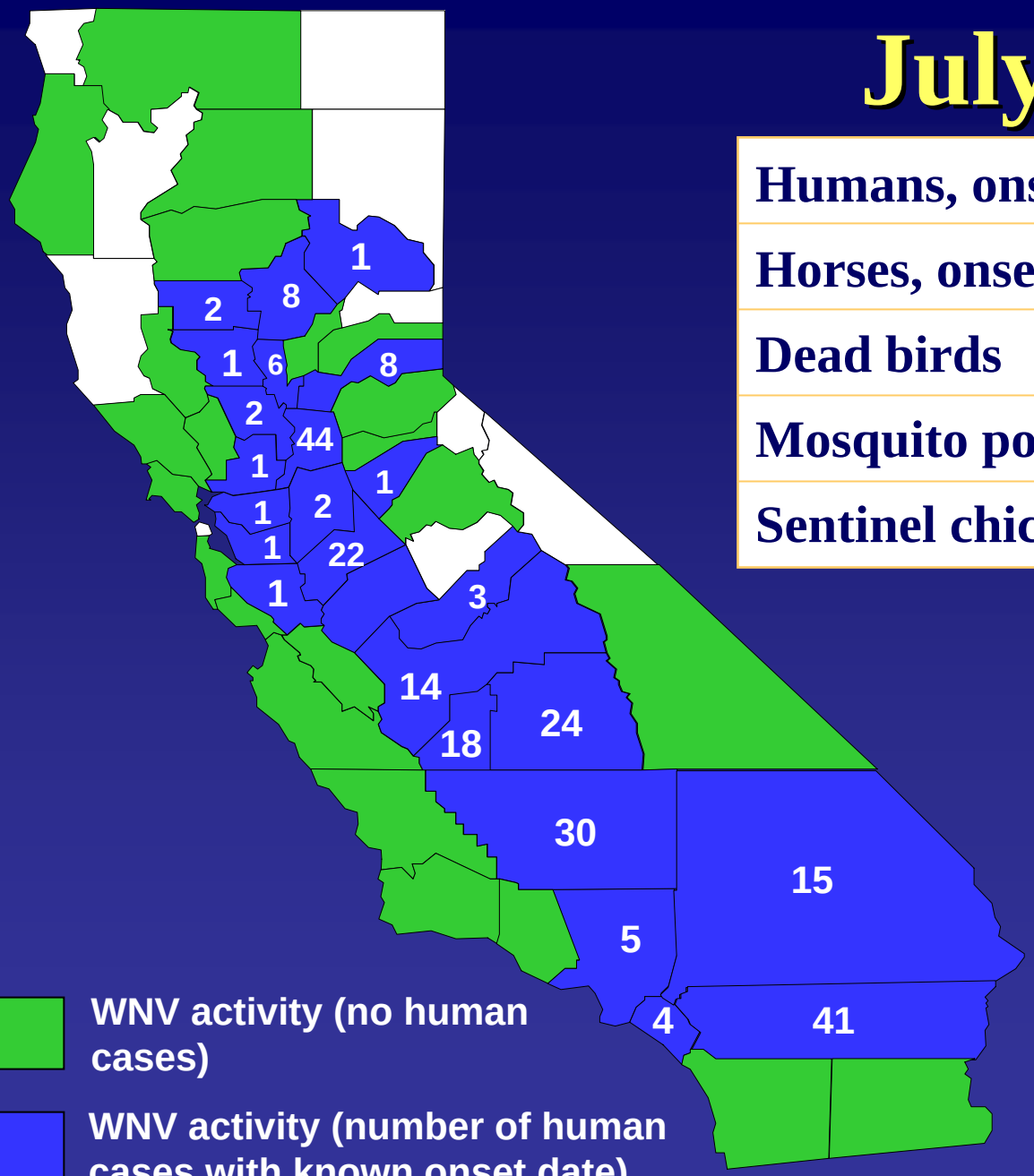
N = 8 counties with human infection

WNV activity (no human cases)

WNV activity (number of human cases with known onset date)

July 31, 2005

Humans, onset / reported	254 / 56
Horses, onset / reported	116 / 48
Dead birds	1,216
Mosquito pools	588
Sentinel chickens	179



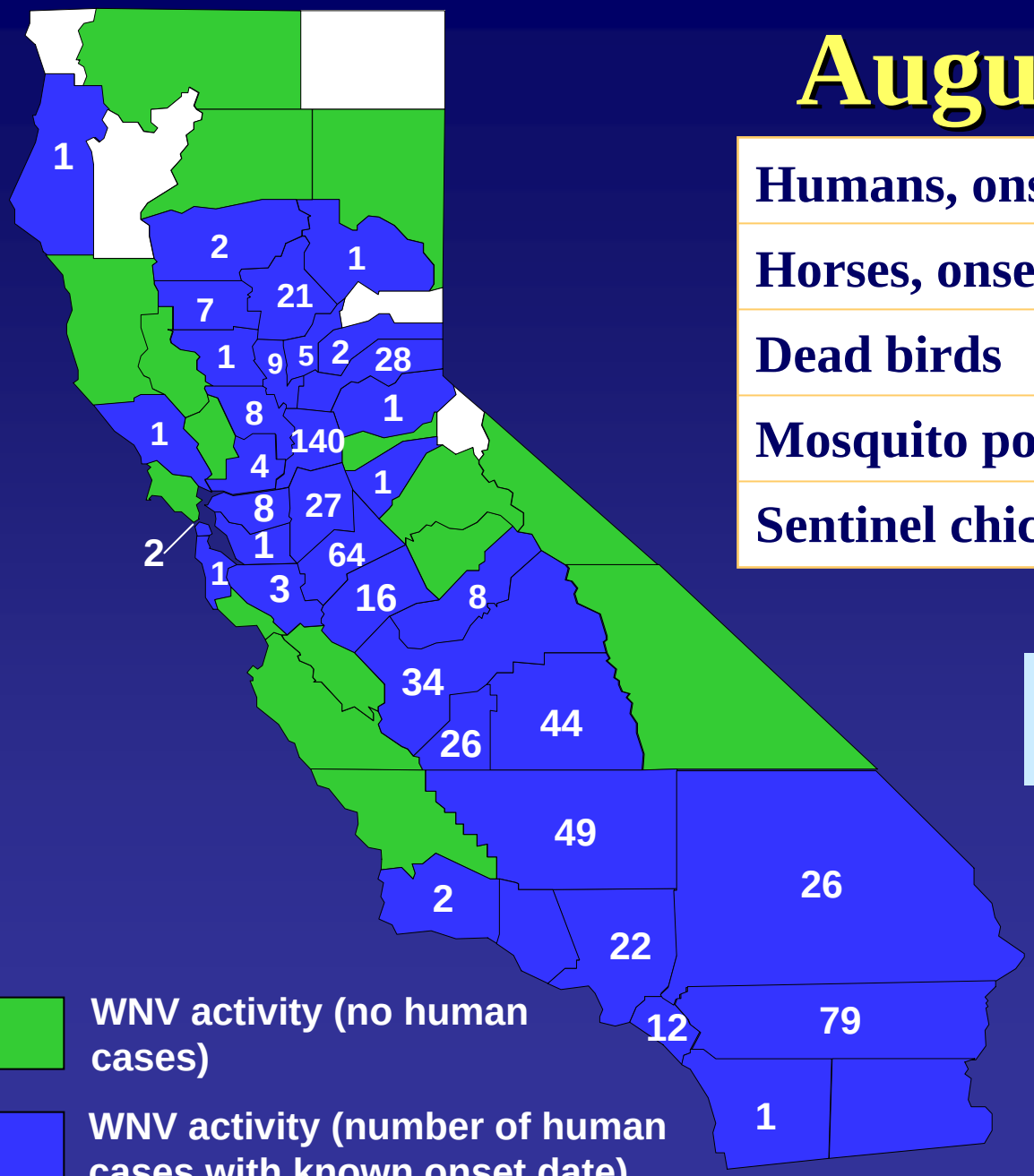
N = 24 counties with human infection

WNV activity (no human cases)

WNV activity (number of human cases with known onset date)

August 31, 2005

Humans, onset / reported	656 / 416
Horses, onset / reported	343 / 277
Dead birds	2,306
Mosquito pools	1,040
Sentinel chickens	557

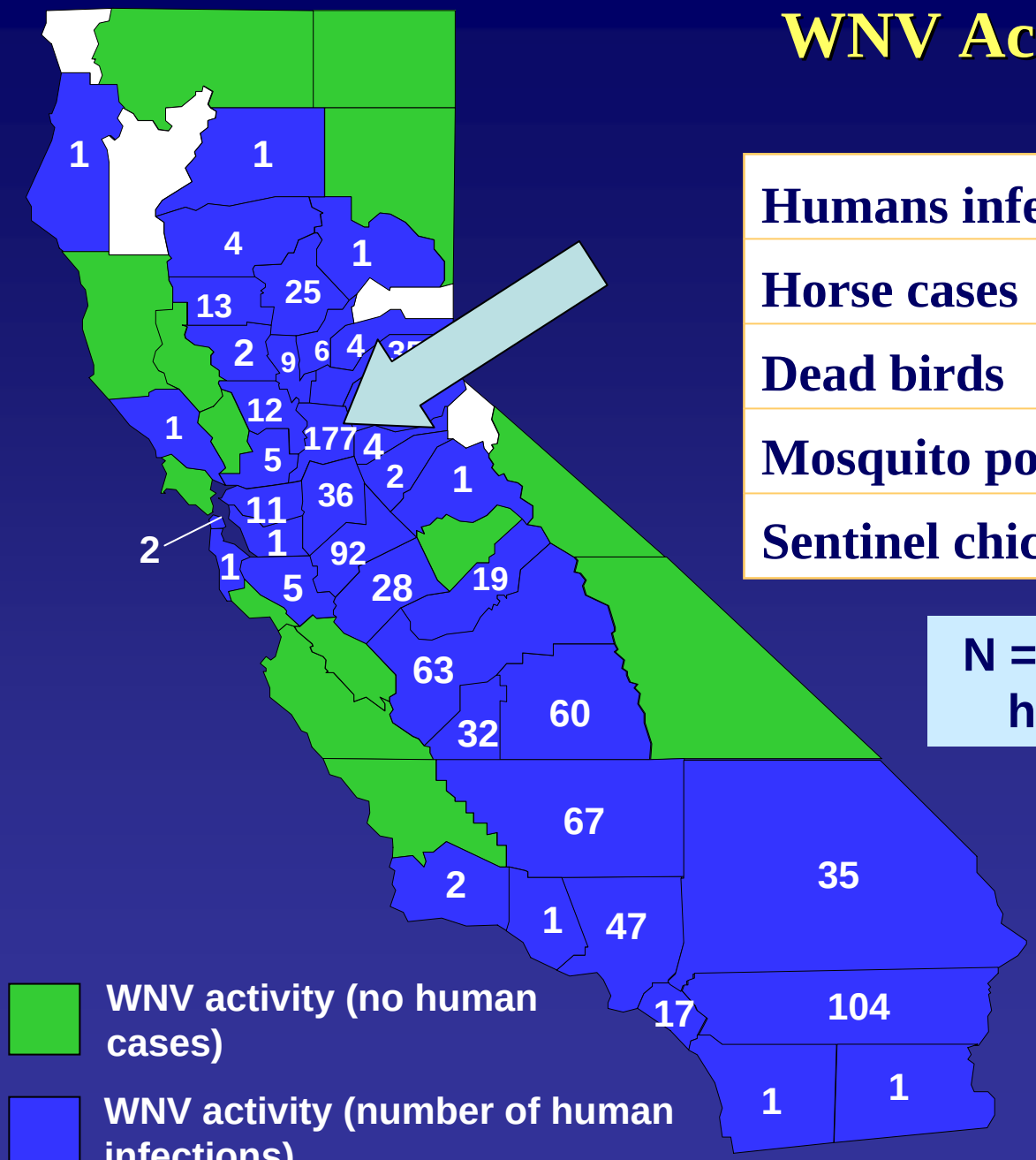


N = 37 counties with human infection

WNV activity (no human cases)

WNV activity (number of human cases with known onset date)

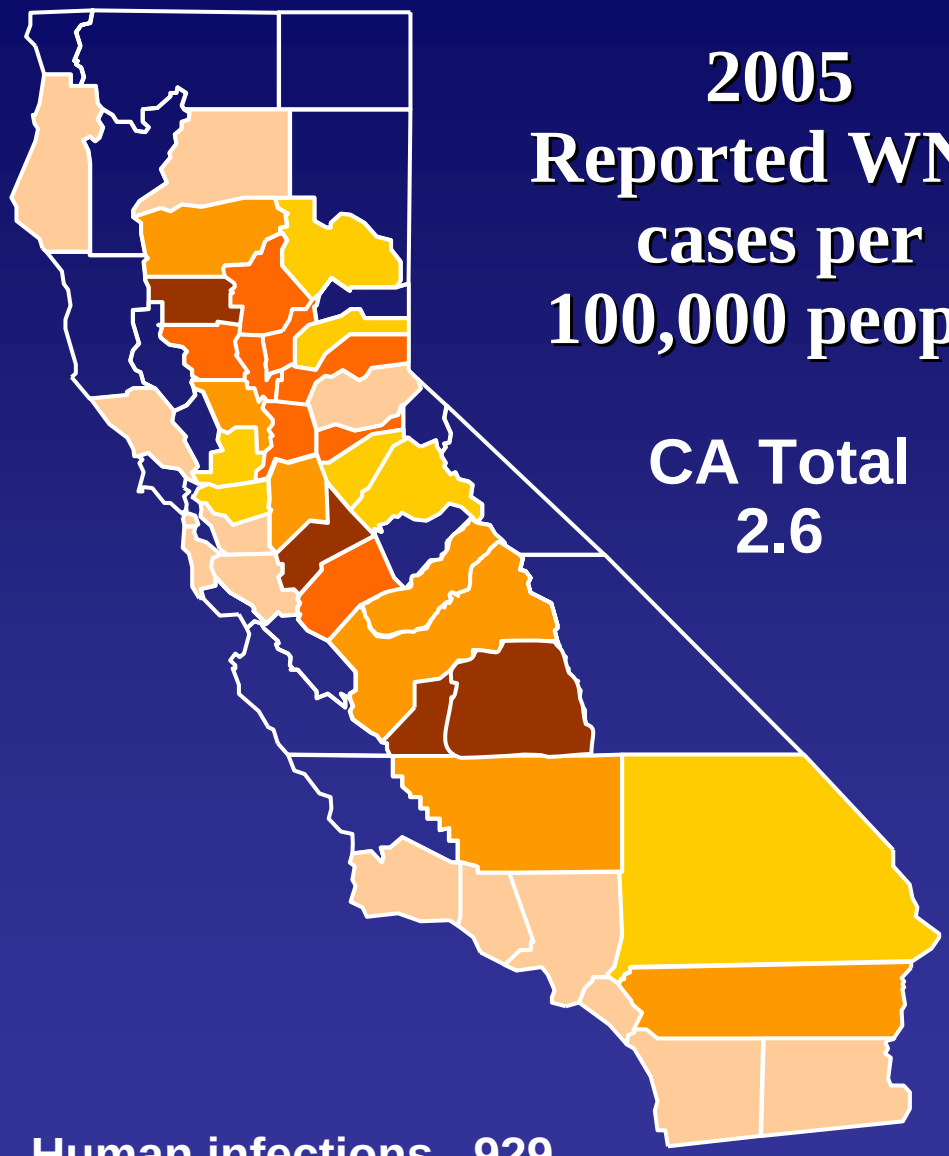
WNV Activity in California 2005



Humans infections	929
Horse cases	456
Dead birds	3,046
Mosquito pools	1,242
Sentinel chickens	790

N = 40 counties with human infection

2005 Reported WNV cases per 100,000 people



CA Total 2.6

Human infections 929

Glenn	49.1	
Kings	24.7	
Stanislaus	19.6	≥ 15
Tulare	15.2	
Sacramento	14.2	
Placer	14.0	
Merced	13.3	
Butte	11.8	≥ 10
Sutter	11.4	
Amador	11.4	
Colusa	10.6	
Yuba	10.0	
Madera	9.8	
Kern	9.5	
Fresno	7.6	
Yolo	7.1	≥ 5
San Joaquin	6.4	
Riverside	6.4	
Tehama	7.1	
Calaveras	4.9	
Plumas	4.8	
Nevada	4.3	
San Bernardino	1.9	≥ 1
Tuolumne	1.8	
Solano	1.3	
Contra Costa	1.2	
Others		> 0

Top Ten Counties with Human WNV Infections

2004

Los Angeles	323
San Bernardino	191
Riverside	112
Orange	64
Kern	60
Fresno	15
Tehama	10
Butte	7
Shasta	6
Glenn	3

2005

Sacramento	177
Riverside	104
Stanislaus	92
Kern	67
Fresno	63
Tulare	60
Los Angeles	47
San Joaquin	36
Placer	35
San Bernardino	35

Human WNV Infections 2004 - 2005

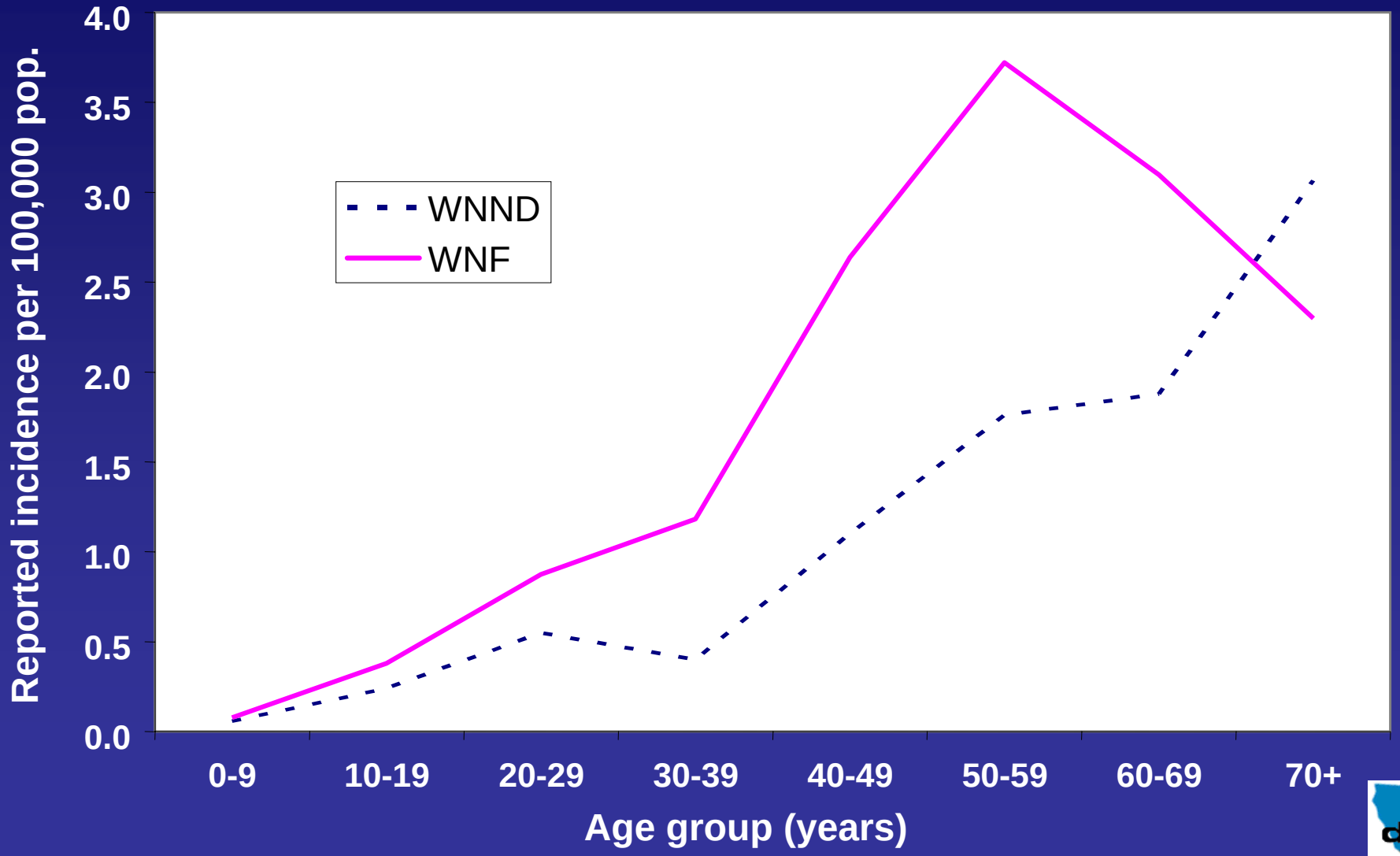
	2004	2005
Human infections	830	929
Counties	23	40
Positive blood donors	66	93
Symptomatic donors	15 (23%)	42 (45%)

Human WNV Clinical Presentation 2004 - 2005

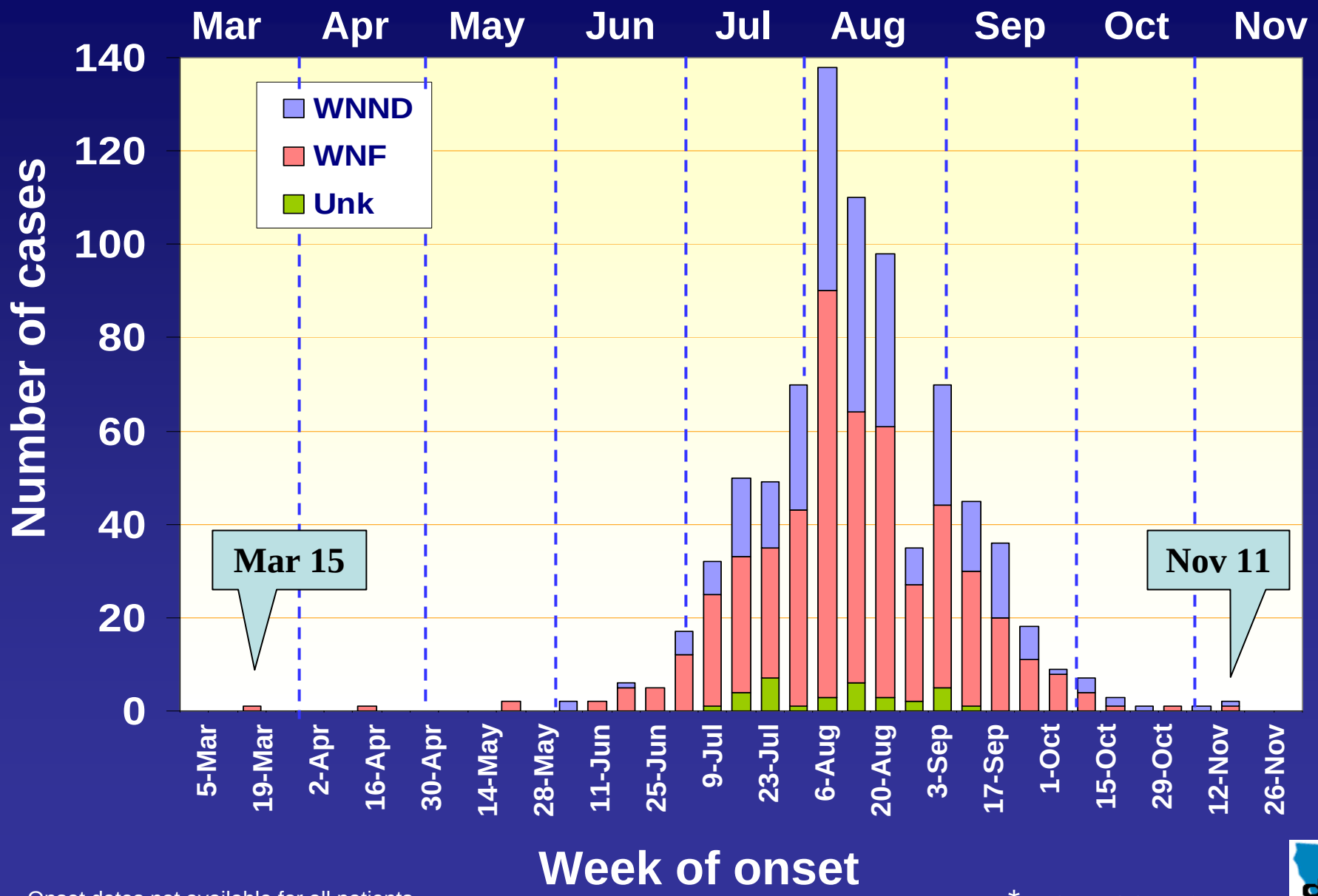
	2004	2005
Number of symptomatic cases	779	874
Clinical presentation		
Neuroinvasive	289 (42%)	303 (36%)
Fever	395 (58%)	530 (64%)
Unknown	95	41
Median age	52 yrs	51 yrs
Fatal cases	28	18
Median age of fatalities	76 yrs	79 yrs

Incidence of WNV illness by age and clinical presentation California 2005

(n=818)



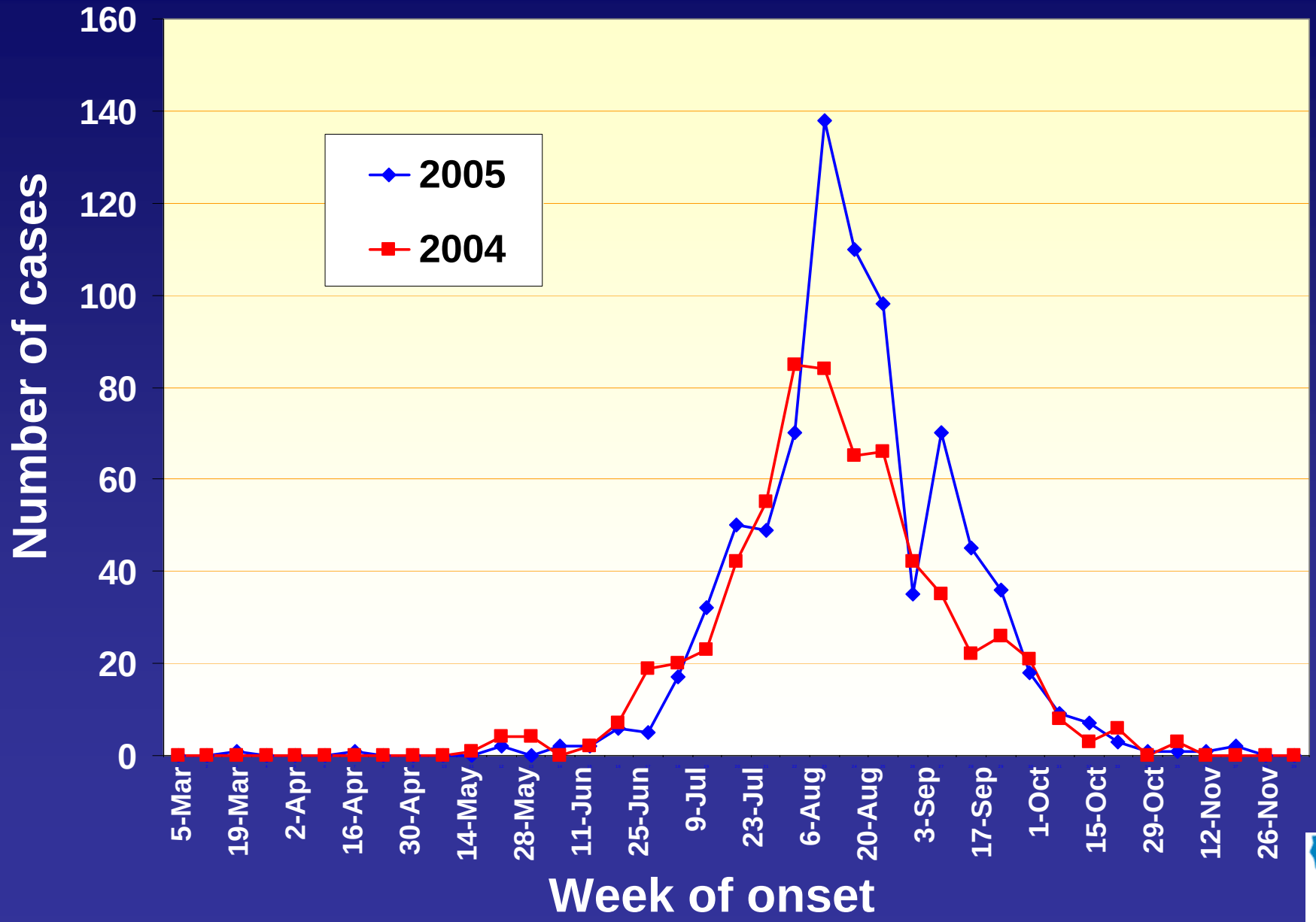
Human WNV Cases in California, 2005



• Onset dates not available for all patients

* Estimated date of onset

Onset of Human Illness 2004 - 2005

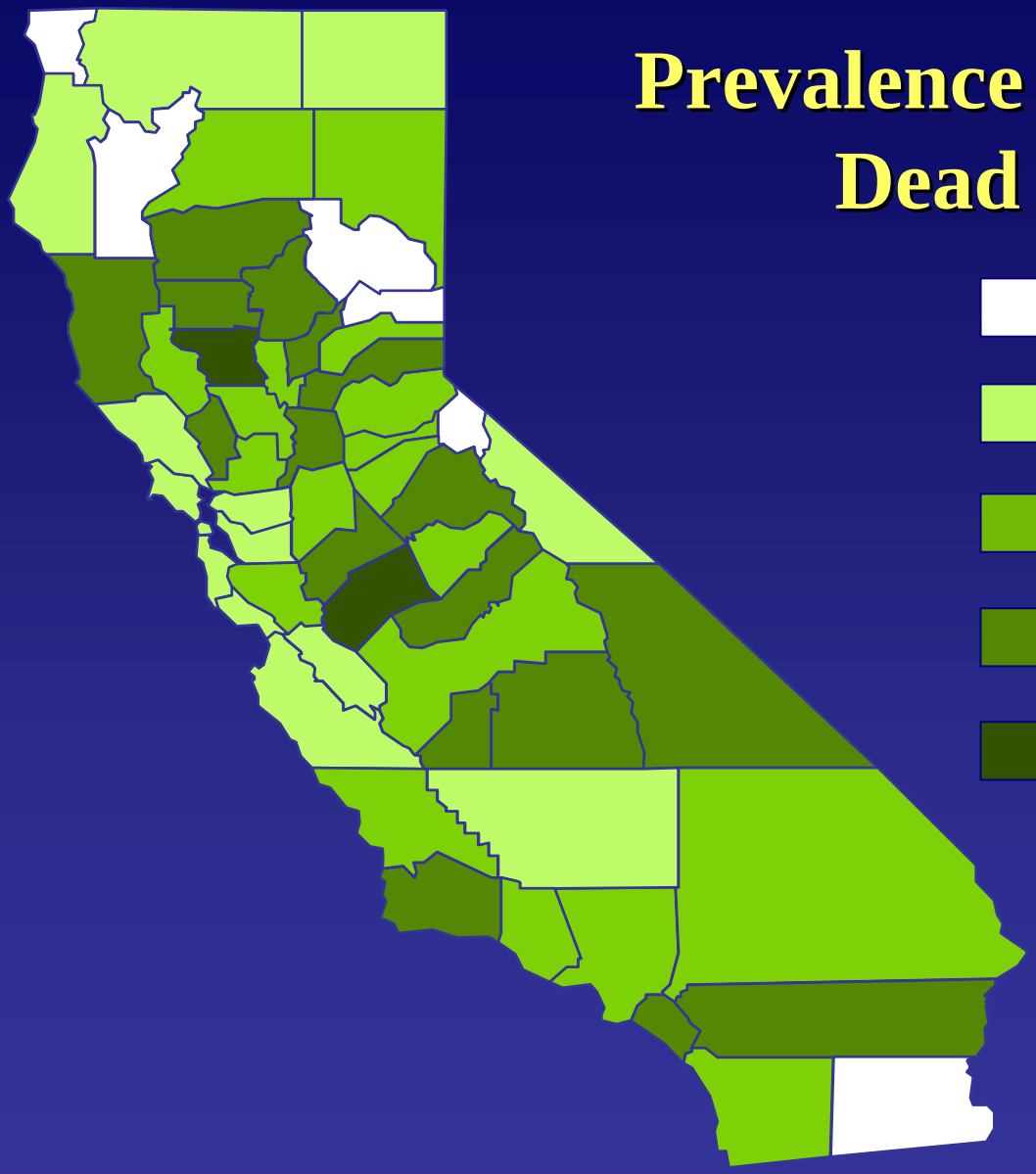


Dead Bird Surveillance

Dead Bird Surveillance Program 2000 - 2005

Year	Reported	Tested	Positive
2000	40	20	0
2001	68	18	0
2002	3,666	653	0
2003	8,650	1,765	96
2004	93,057	5,728	3,232
2005	109,375	9,263	3,046

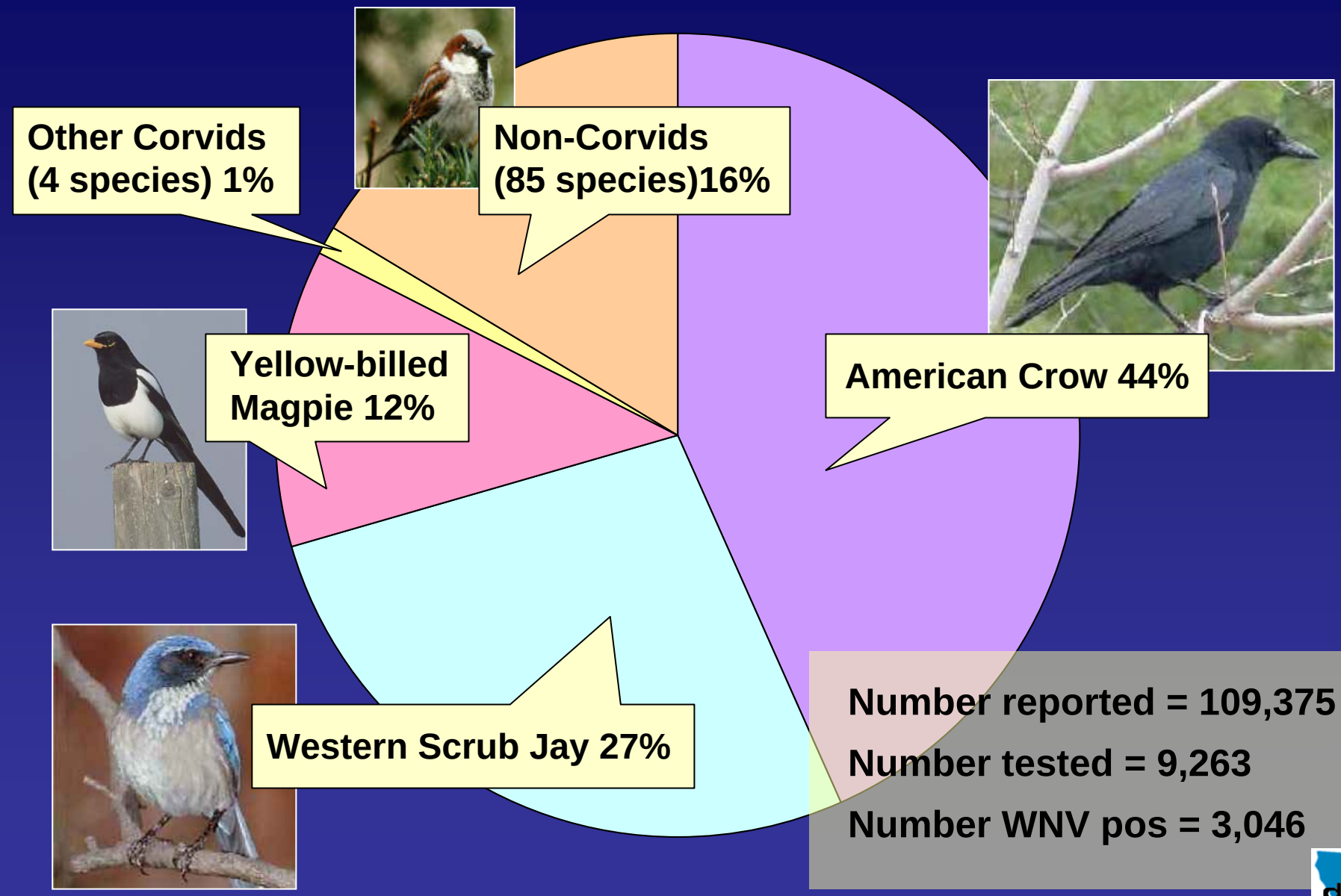
Prevalence of WNV in Tested Dead Birds*, 2005



- No positive birds
- **1 – 19 %**
- **20 –39 %**
- **40 – 59 %**
- **60 – 79 %**

* Prevalence = (# pos birds / # tested birds) x 100

2005: 92 species of WNV positive dead birds

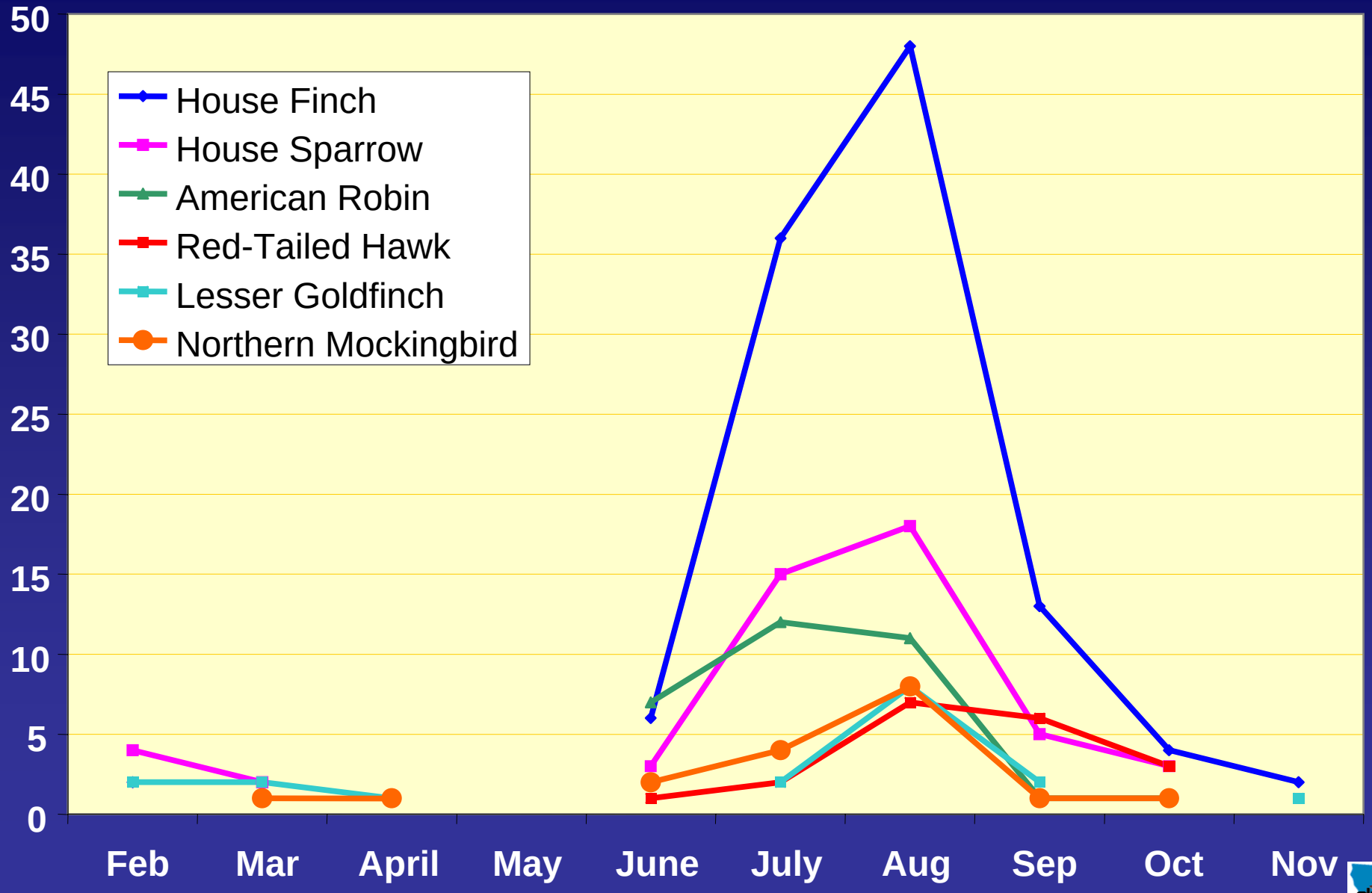


Number reported = 109,375

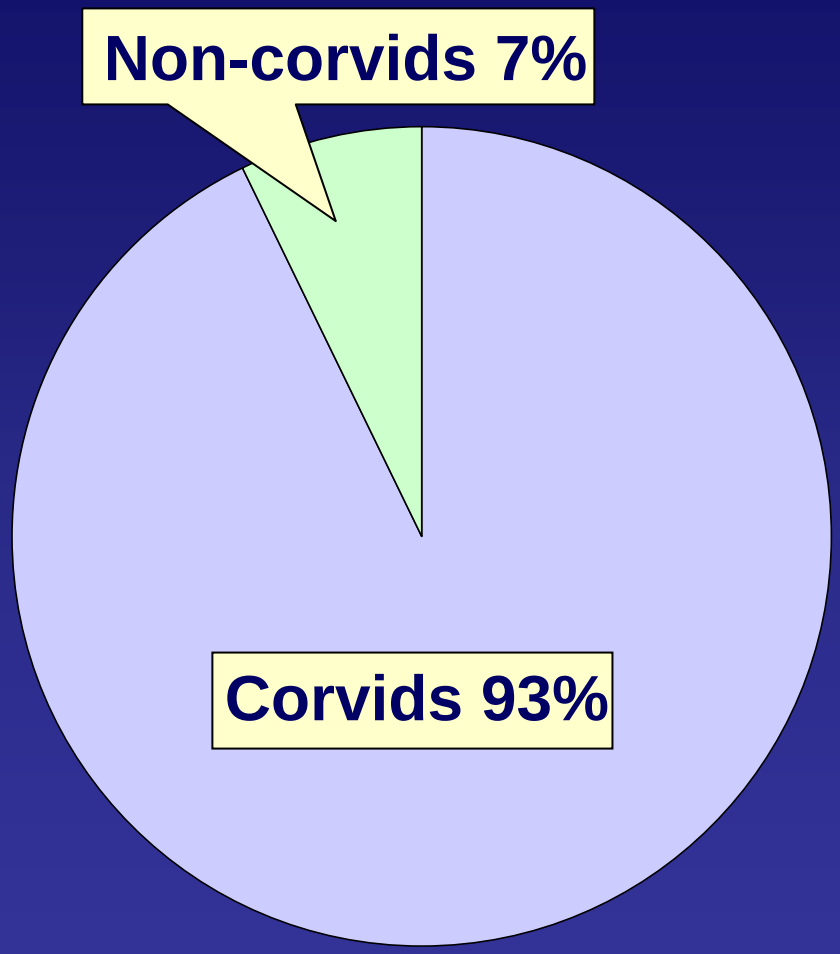
Number tested = 9,263

Number WNV pos = 3,046

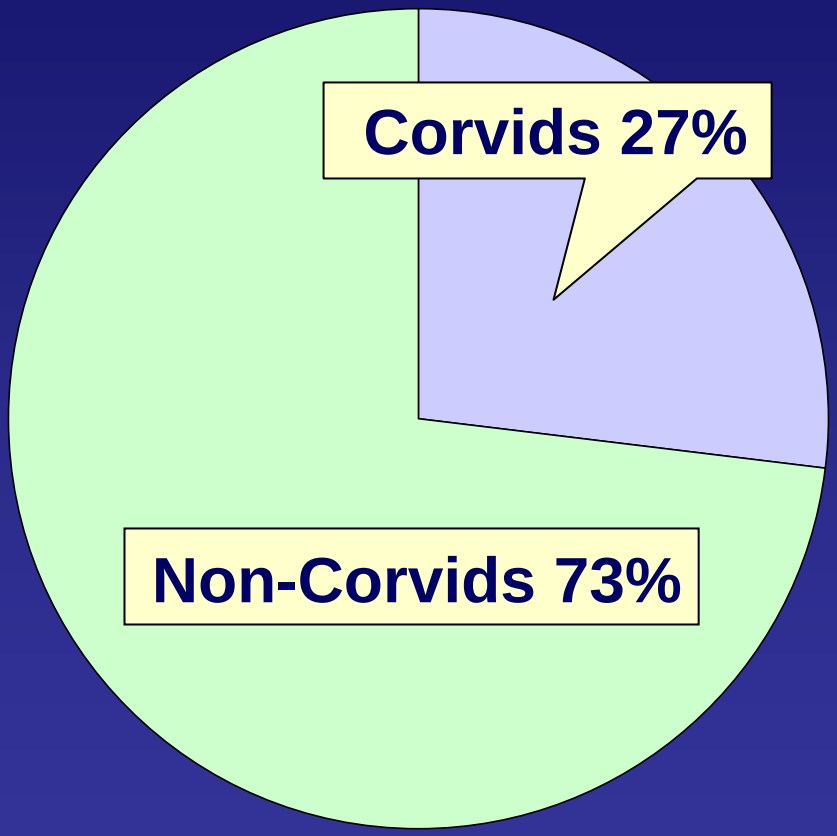
Top 6 WNV Positive Non-Corvids, 2005



WNV Positive Corvids and Non-Corvids January-April



2004

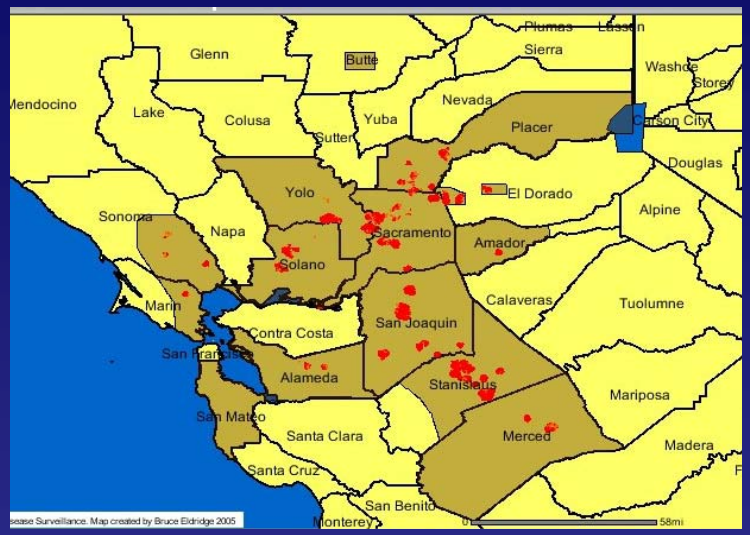


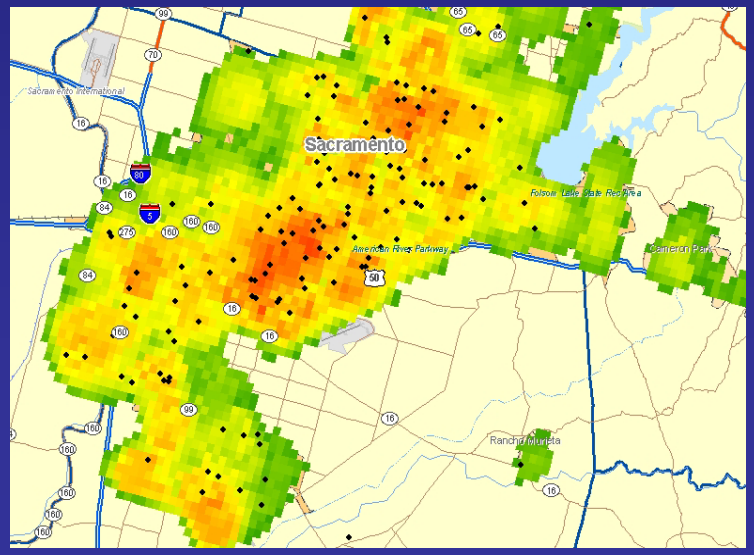
2005

Dead Birds Reported 2005

n = 109,375

DYCAST* Human WNV Risk Modeling System





DYCAST in 2005

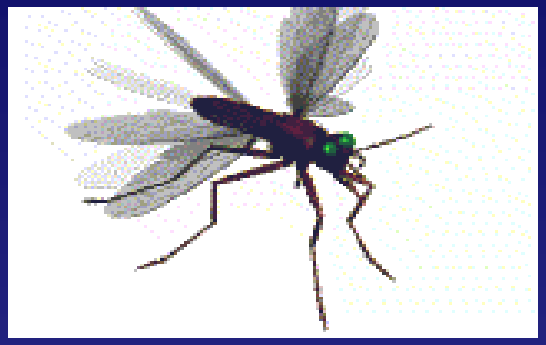
- **83% accuracy in predicting human cases with quarter-square mile resolution (cells)**
- **50% of cases occurred in cells identified as high risk approximately one month prior to case onset**
- **Used to evaluate efficacy of aerial adulticiding in Sacramento County**

*** Dynamic Continuous-Area Space-Time**

WNV in California
Tree Squirrels - 2005

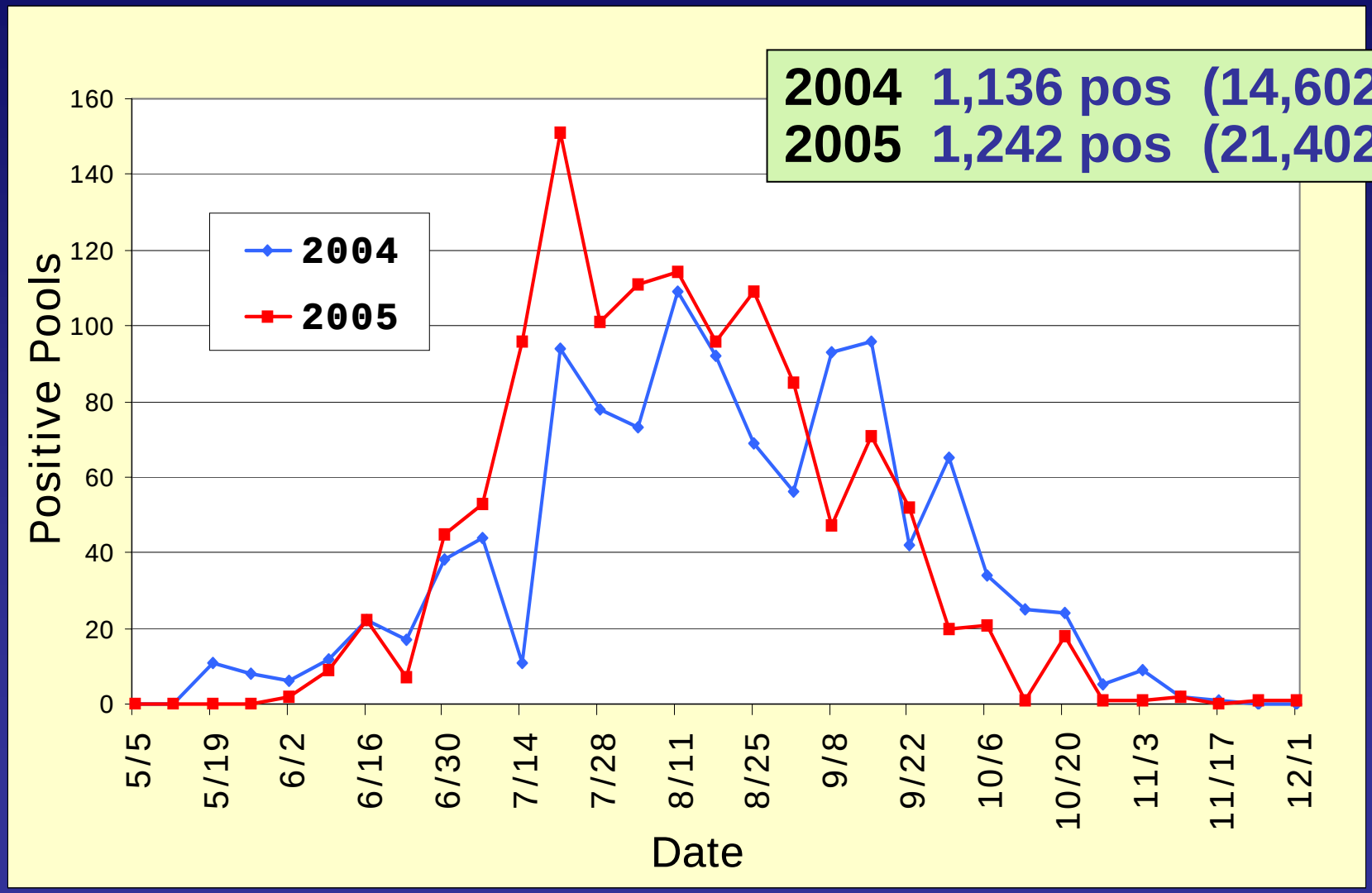
- First positive squirrel: June 10, 2005
  - Placer County
- Prevalence (PCR) was 27% (48 / 180)
- Similar prevalence in dead birds (35%)

WNV Activity in Mosquitoes in 2005



WNV Activity in Mosquitoes

number positive pools

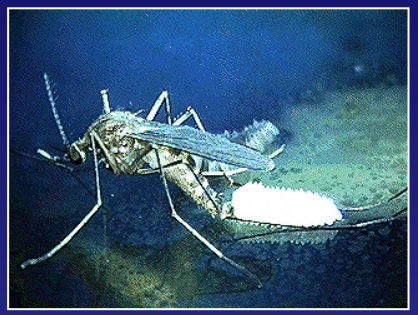


WNV Positive Mosquito Species

1,242 pos. pools / 21,402 mosquitoes tested

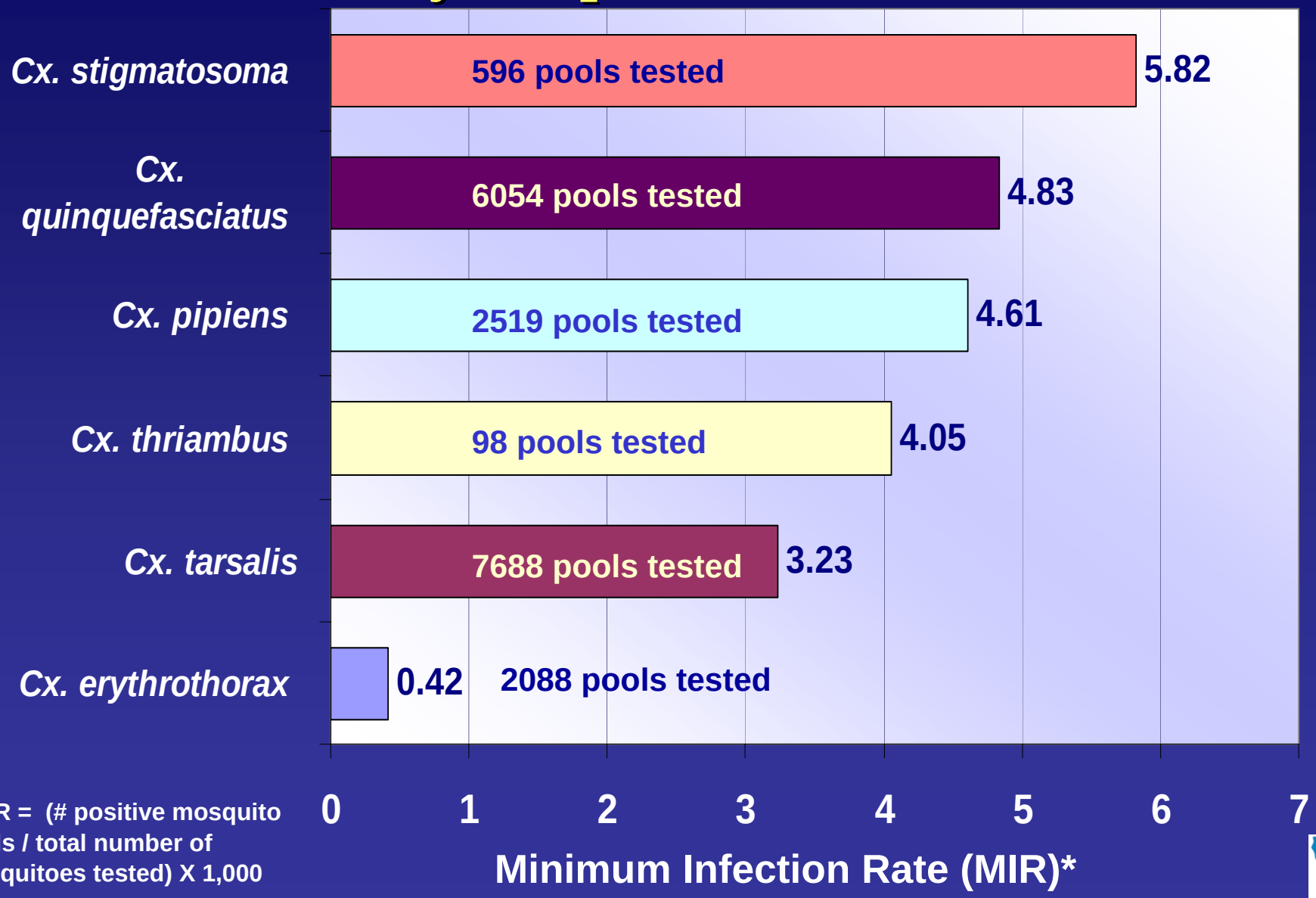
Culex

quinquefasciatus	**476**	**(38%)**
tarsalis	**460**	**(37%)**
pipiens	**240**	**(19%)**
stigmatosoma	**33**	**(2.7%)**
erythrothorax	**26**	**(2.1%)**
thriambus	**7**	**(<1%)**



Plus *Anopheles freeborni* (1)

Minimum Infection Rates (per 1,000) by Species July - September 2005

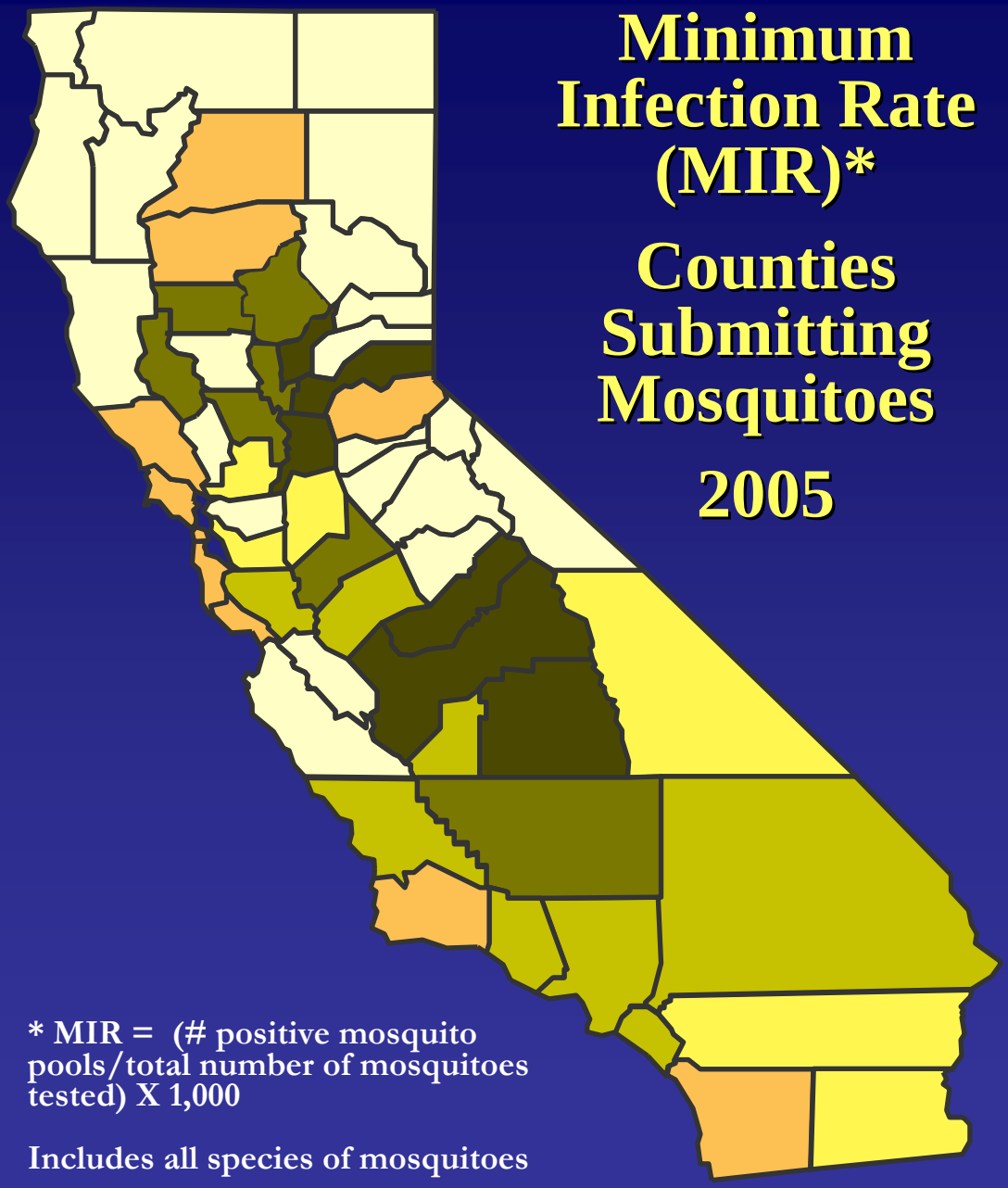


* MIR = (# positive mosquito pools / total number of mosquitoes tested) X 1,000

Minimum Infection Rate (MIR)*

Counties Submitting Mosquitoes

2005



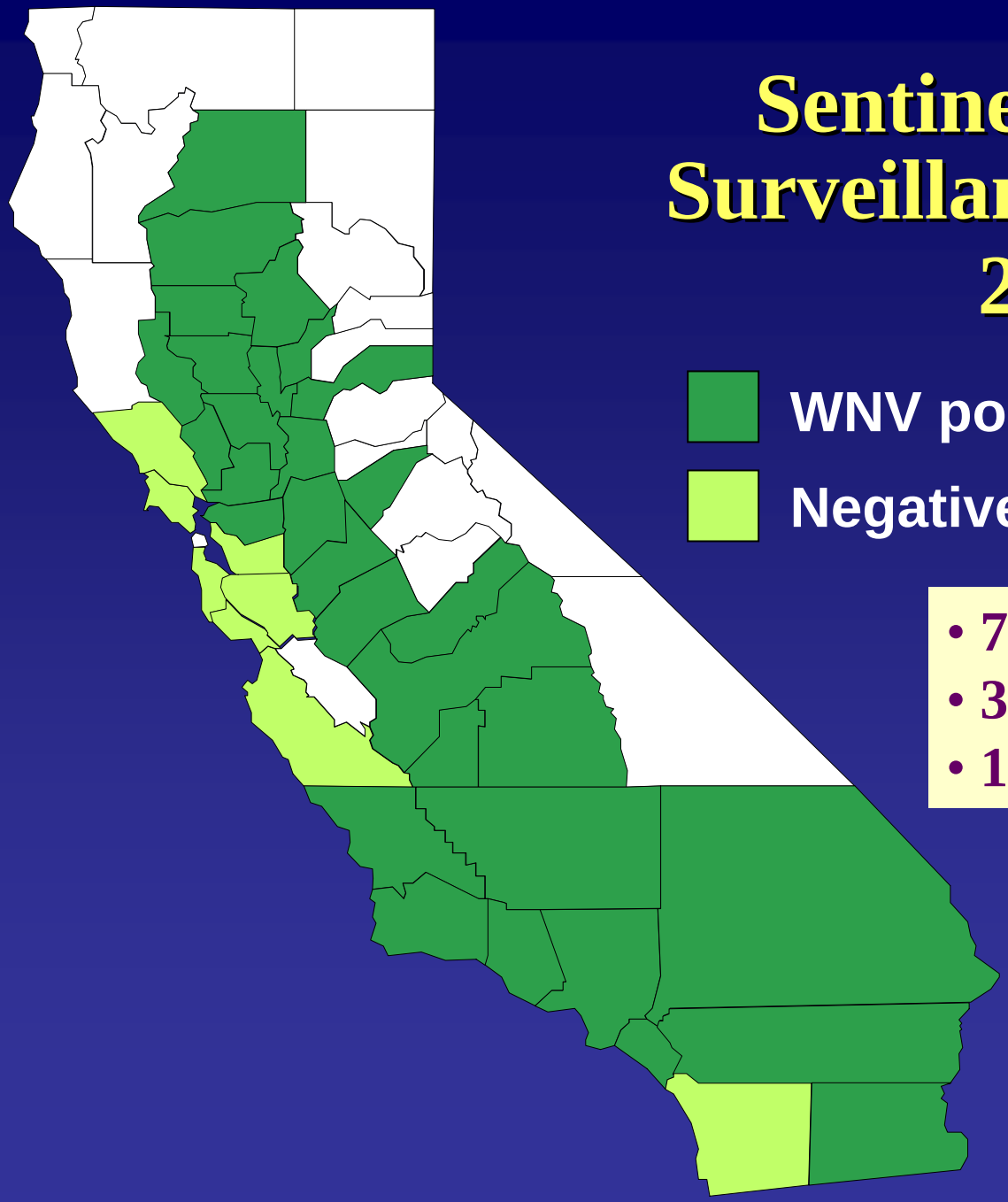
Sacramento	7.3	≥ 4.0
Placer	5.9	
Fresno	4.9	
Tulare	4.5	
Yuba	4.4	
Madera	4.3	
Yolo	3.7	≥ 2.0
Stanislaus	3.6	
Butte	2.8	
Sutter	2.7	
Lake	2.4	
Glenn	2.4	
Kern	2.0	
San Bernardino	1.9	≥ 1.0
Los Angeles	1.7	
Ventura	1.7	
Kings	1.5	
San Luis Obispo	1.5	
Santa Clara	1.4	
Merced	1.2	
Orange	1.0	
Imperial	0.8	≥ 0.1
Riverside	0.8	
San Joaquin	0.8	
Solano	0.6	
Alameda	0.5	
Inyo	0.3	
Contra Costa	0.1	
No positive pools	0	
No mosquitoes tested		

* MIR = (# positive mosquito pools/total number of mosquitoes tested) X 1,000

Includes all species of mosquitoes

WNV Activity in Sentinel Chickens in 2005

Sentinel Chicken Surveillance Program 2005

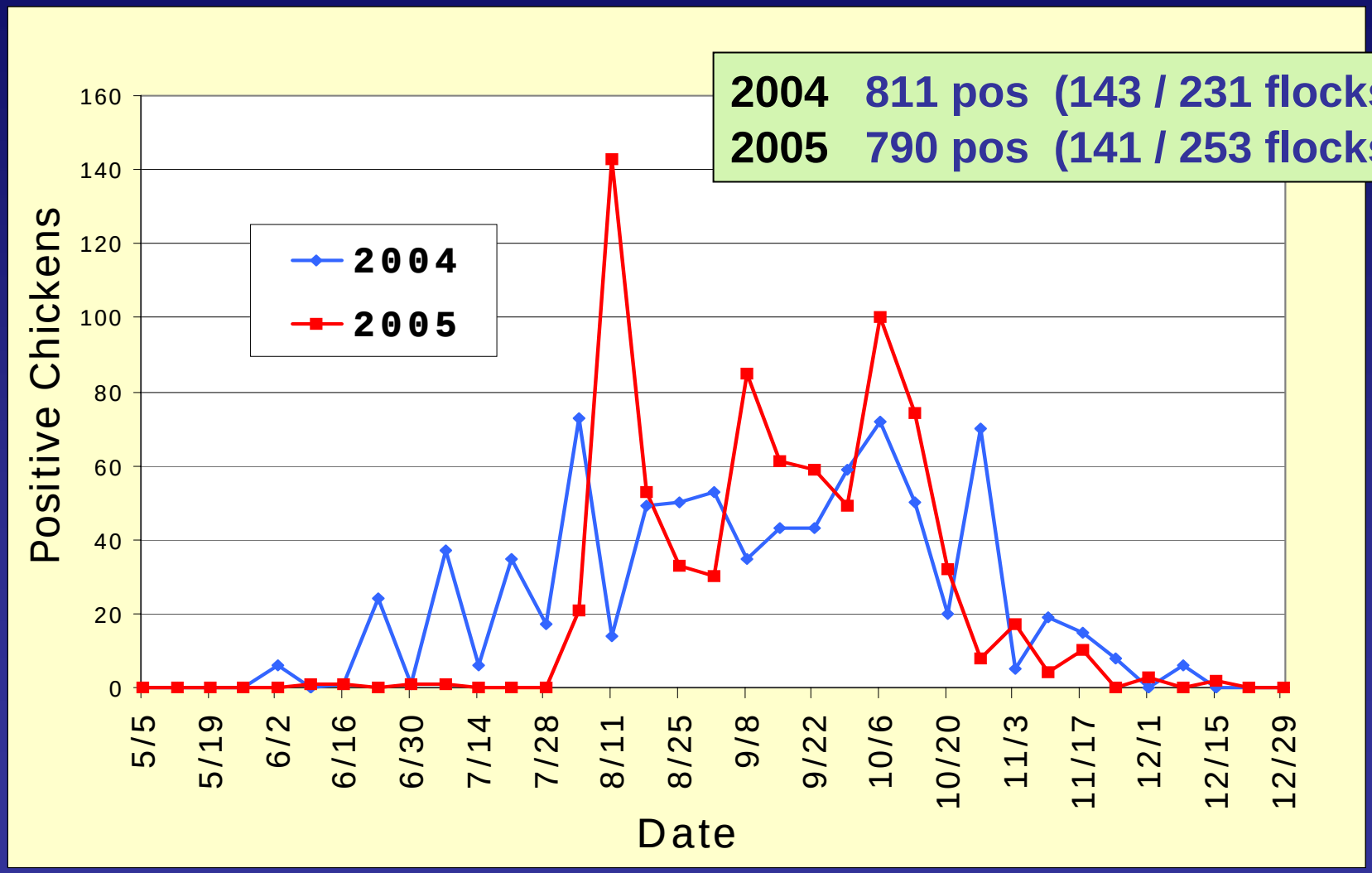


WNV positive flock

Negative flock

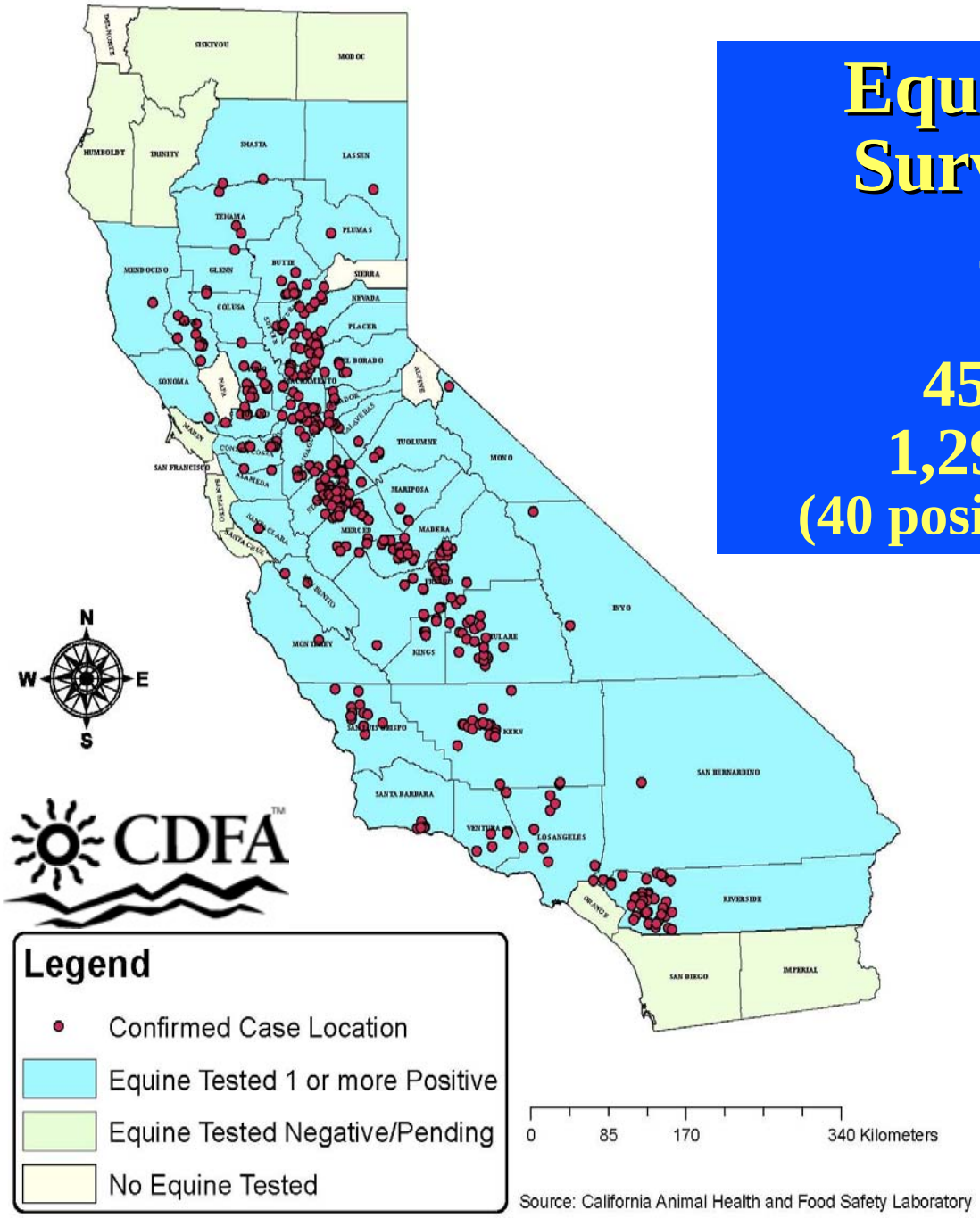
- 790 seroconversions
- 31 counties
- 141 / 253 flocks

WNV Activity in Sentinel Chickens



Equine WNV Surveillance 2005

456 cases
1,295 tested
(40 positive counties)

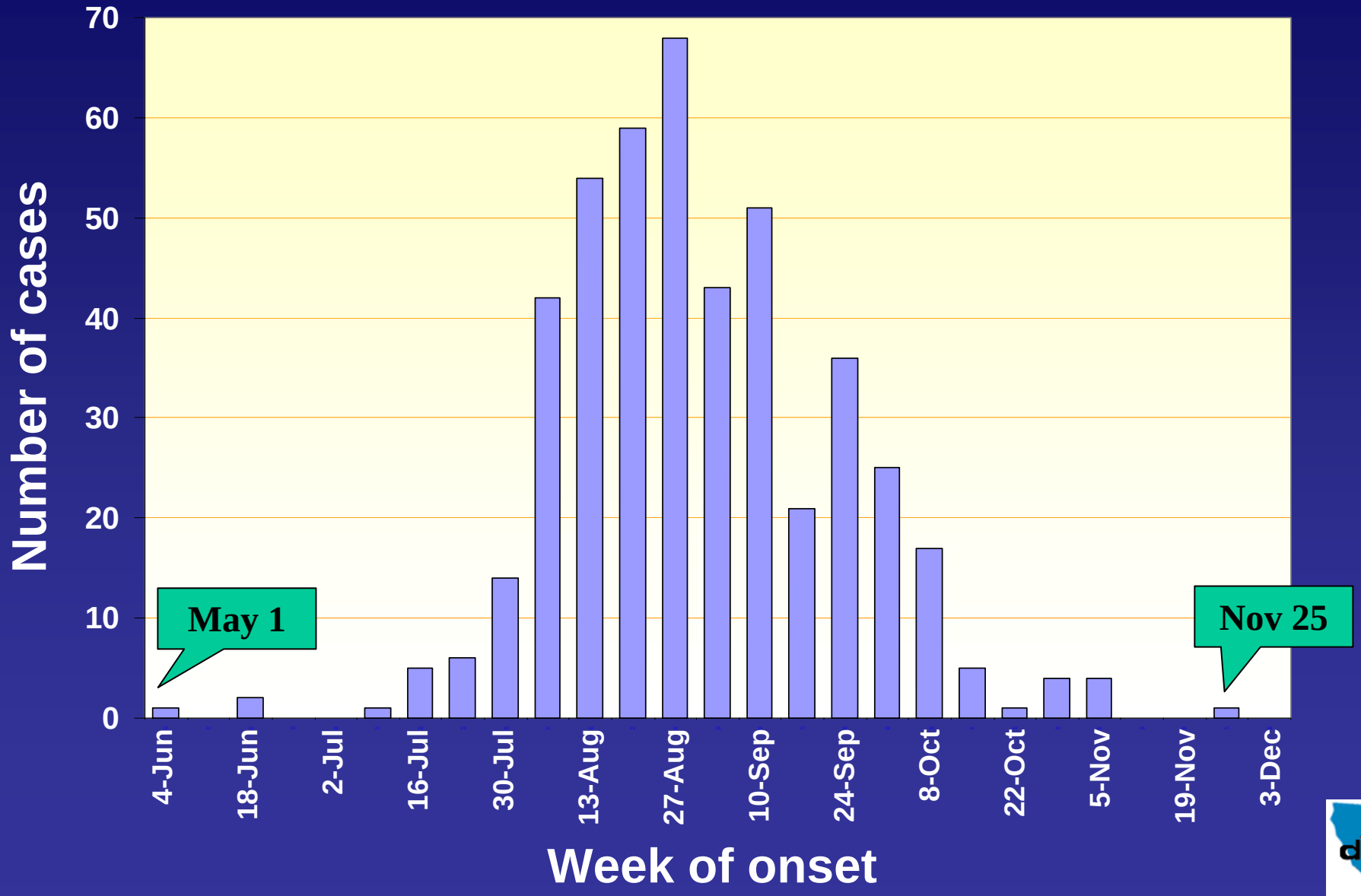


2004: 540 cases

2005 Equine WNV Data

- 456 WNV infected horses (40 counties)
- 200 (44%) died / euthanized
- Vaccination status
  - 20 properly vaccinated
  - 78 improperly vaccinated
  - 342 non-vaccinated
- Median age: 13 years (4 mos – 40 years)

Week of Onset for Equine WNV Cases California, 2005



WNV Team at DHS

- VBDS
  - ✓ Vicki Kramer
  - ✓ Stan Husted
  - ✓ Al Hom
  - ✓ Ryan Carney
  - ✓ Kerry Padgett
  - ✓ Lauren Marcus
  - ✓ Colleen Barclay
  - ✓ Anne Kjemtrup
  - ✓ Mark Novak
  - ✓ Renjie Hu
  - ✓ Hotline staff
  - ✓ Regional biologists
- DIS
  - ✓ Jon Rosenberg
- VPHS
  - ✓ Ben Sun
  - ✓ James Glover
  - ✓ Claudia Erickson
- VRDL
  - ✓ Carol Glaser
  - ✓ Cynthia Jean
  - ✓ Cindi Cossen
  - ✓ Liz Baylis
  - ✓ Shilpa Gavali
- OPA
  - ✓ Lea Brooks

Collaborators

- Local Health Departments
- Local Public Health Laboratories
- Environmental Health Departments