



Mosquito Control In California - Is It Working?

**Craig Downs, General Manager
Contra Costa Mosquito & Vector Control District**

Origins of mosquito control in California

From California Folklore...

"In the Gold Rush period, mosquitoes in the San Francisco area wore pants made from the sails of ships lying idle in the Bay. On the east coast, sailors did not mind the Jersey mosquitoes, but whenever they were attacked by mosquitoes wearing sailcloth pants, there was panic aboard, for the sailors recognized them as roving bands of mosquitoes from San Francisco."

Origins of mosquito control in California - 1915

Many historical accounts state that areas of the SF Bay Area were often uninhabitable

First mosquito abatement district was established in Marin Co., in 1915, to combat salt marsh mosquitoes, followed closely by San Mateo Co. in 1916



Origins of mosquito control in California - 1917

Another mosquito abatement district was formed in Bakersfield to control endemic malaria

Two more districts were formed in the Northern Sacramento Valley; Tehama Co. in 1917 and Shasta Co. in 1919

Origins of mosquito control in California - 1930

In the summer of 1930, a major epizootic of encephalomyelitis developed in horses in the San Joaquin Valley (WEE)

Another twelve districts were formed in the 20's and 30's

Legislative Intent origin 1915, rev'd 2002

• **H&SC Section 2001 recognizes that:**

- California's climate and topography supports the development of human disease vectors and nuisance pests.
- Some vector-borne diseases may be fatal.
- California's international connections increase the opportunity for vector and disease introductions.
- WNV and the Asian Tiger Mosquito are specifically identified as recent introductions.

Legislative Intent

- **H&SC Section 2001 declares that:**

- Personal protection against mosquitoes is only partially effective.
 - Protection is best achieved by organized public programs.
- Protection against vector borne diseases is an essential service that is vital to public health

Mosquito abatement and vector control districts have served this role starting in 1915.

Goal of Mosquito Control

To maintain populations of mosquitoes and other vectors at “acceptable levels” (thresholds) within a geographic area or region

- to prevent disease transmission
- to maintain the quality of life for the members of the community

Integrated Pest Management

IPM is an ecosystem-based strategy which focuses on long term prevention of mosquito-borne disease and damage through a combination of physical, biological and chemical methods

Our goal is not to eradicate mosquitoes but to keep the population below levels that affect public health

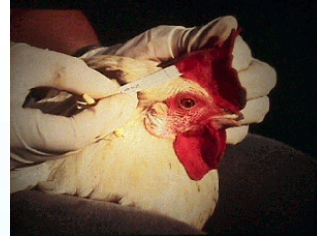
Pesticides are used when surveillance indicates they are necessary, and treatments are made with the goal of reducing mosquitoes while minimizing risks to people, wildlife, and the environment

IPM: Basic components

- Surveillance
- Treatment thresholds
- Control
 - Habitat manipulation
 - Water management practices
 - Biological
 - Chemical, including a pesticide resistance management component
- Training and certification
- Compliance with environmental regulations

Encephalitis virus Surveillance

- Sentinel chickens tested for antibodies twice monthly May-October



- Mosquito samples (500 per site) tested weekly July-October



- Dead birds tested in-house and sent to DHS for confirmation
- Part of statewide surveillance network coordinated by CDHS/VBDS

Larval control

- Larval control preferred
- Choice of method based on:
 - Habitat
 - Species/life stages present
 - Population density
 - Nuisance/disease potential
 - Presence/absence of natural predators
 - Presence/absence of sensitive species
 - Water conditions



Larval control

We use a combination of methods:

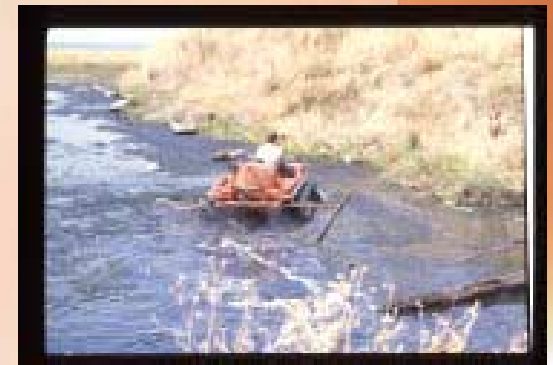
- Source reduction (eliminating the water or restoring natural flow)
- Biological control: mosquito-eating fish
- Pesticides
 - Biological larvicides
 - Insect growth regulator
 - Larvicidal oils
 - Monomolecular surface film
 - Organophosphate



Mosquito larvae



mosquitofish



ATV spray operation

How do we know treatments are effective for larval control?

- Visual inspection
- Pre and post treatment larval dipping counts
- Emergent jars (insect growth regulator only)

Controlling adult mosquitoes

- When larval control is not possible or has been used to the fullest extent possible, adult mosquito control may be required to suppress populations
- Once there are adult mosquitoes in an area, killing larvae will not reduce biting or disease transmission.



Truck mounted ULV application

Controlling adult mosquitoes

- Adult mosquito control products may be applied either using ground-based equipment, fixed wing airplanes, or helicopters.
- Available products include natural pyrethrins and synthetic pyrethroids, such as resmethrin, sumithrin, and permethrin; and the organophosphates, malathion and naled.

Ground-based (vehicle mounted) adult mosquito control operations

- Where road access is adequate, such as in urban and suburban residential areas, good coverage may be achieved.
- Applications can be done throughout the night, thereby targeting night-active mosquito species.
- Applications are prone to skips and patchy coverage in areas where road coverage is not adequate or in which the habitat contains significant barriers to spray dispersal and penetration.

<http://www.cdc.gov/ncidod/dvbid/westnile/resources/wnv-guidelines-aug-2003.pdf>

Aircraft-based adult mosquito control operations

- Capable of covering larger areas in shorter time periods than a ground-based application.
- Less prone to patchy coverage than ground-based application in areas where road coverage is not adequate.

<http://www.cdc.gov/ncidod/dvbid/westnile/resources/wnv-guidelines-aug-2003.pdf>

How do we know treatments are effective for adult control?

- Pre- and post spray vector mosquito densities inside and outside control area
 - Landing counts
 - Trap counts
 - Caged mosquito
- Weather conditions during application (temperature, wind speed, direction).

2004 California Activities

- 53 member agencies comprise MVCAC
- Majority incorporate adult control w/ efficacy component
- Various suburban/urban areas throughout state sprayed (ultra low volume) without any reported incidents

Environmental compliance

- Comply with FIFRA, CWA, and CEQA regulations
- Report pesticide usage to County Dept. of Agriculture and Regional Water Resources Control Board
- Subject to inspections by Agriculture Department
- Operate under M.O.U. with California Dept. of Health Services which also administers certification and training

Pesticide Use for Mosquito Control – Safety Record

- No reported pesticide exposure related cases in CA 2003 – 2004.

pers. com. Dr. V. Kramer, Chief, Vector-Borne Disease Section, CA DHS.

- Surveillance for Acute Insecticide-Related Illness Associated with Mosquito-Control Efforts – Nine States, 1999-2002

CDC, Morbidity and Mortality Weekly Report, July 11, 2003/52(27);629-634.

- The findings in this report indicate that serious adverse outcomes potentially related to public health insecticide application were uncommon. When administered properly in a mosquito-control program, insecticides pose a low risk for acute, temporary health effects among persons in areas that are being sprayed and among workers handling and applying insecticides.

- **Dr. Arthur L. Craigmill, Extension Toxicologist reports in the September 2003 issue of Environmental Toxicology Newsletter, Cooperative Extension, University of California, Davis**

Pesticide Environmental Stewardship Program

- Administered through U.S. EPA
- American Mosquito Control Association member since May 1996
- Mosquito and Vector Control Association of CA is one of seven state and regional associations that participate through AMCA

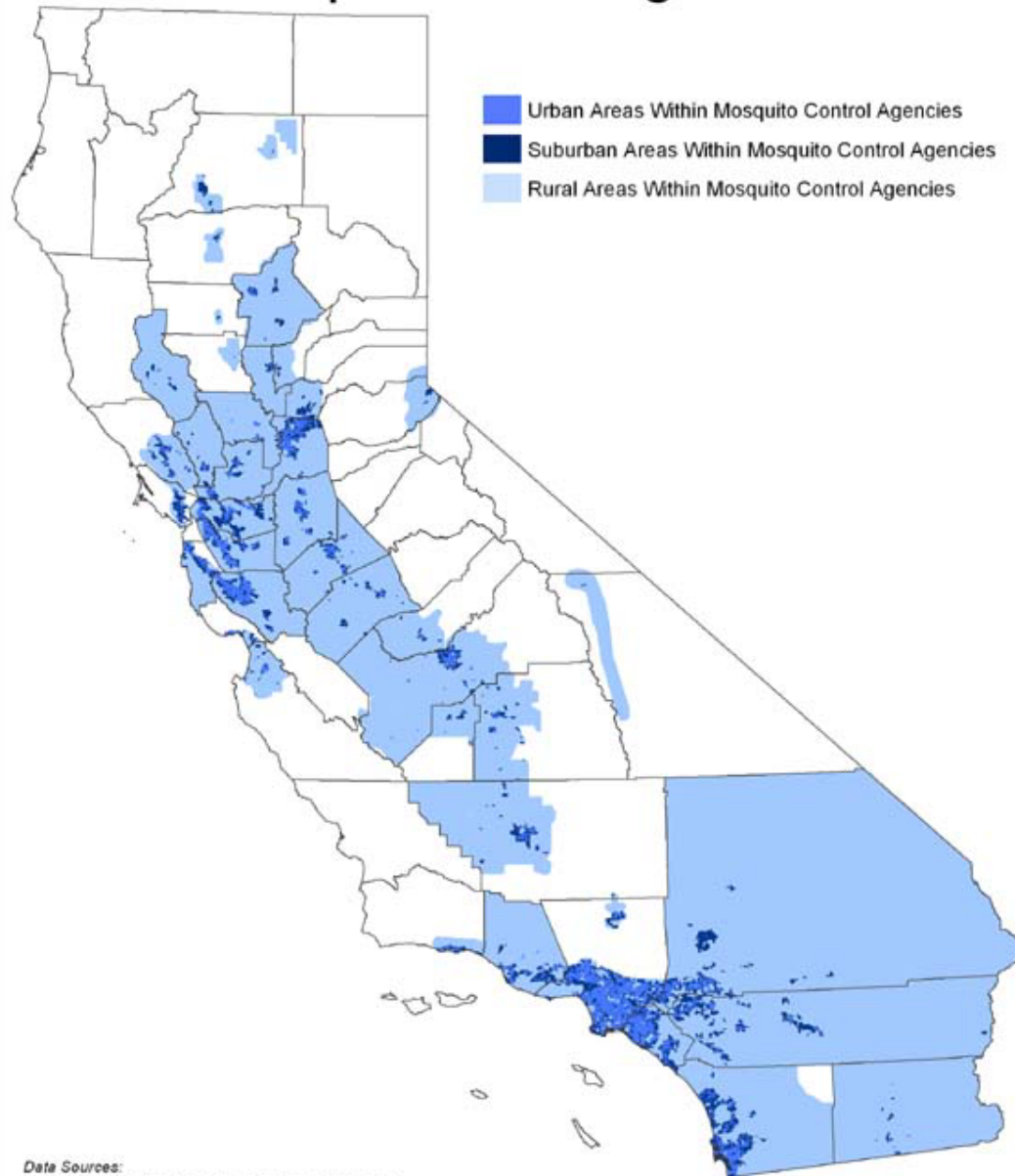
Pesticide Environmental Stewardship Program

- a voluntary program that forms partnerships with pesticide users to reduce the health and environmental risks associated with pesticide use and implement pollution prevention strategies

Pesticide Environmental Stewardship Program – AMCA 2004 goals

- Public lands – IPM
- CE programs for mosquito control workers
- Public Education programs
- Proper surveillance for effective, targeted responses

Human Population Within Mosquito Control Agencies



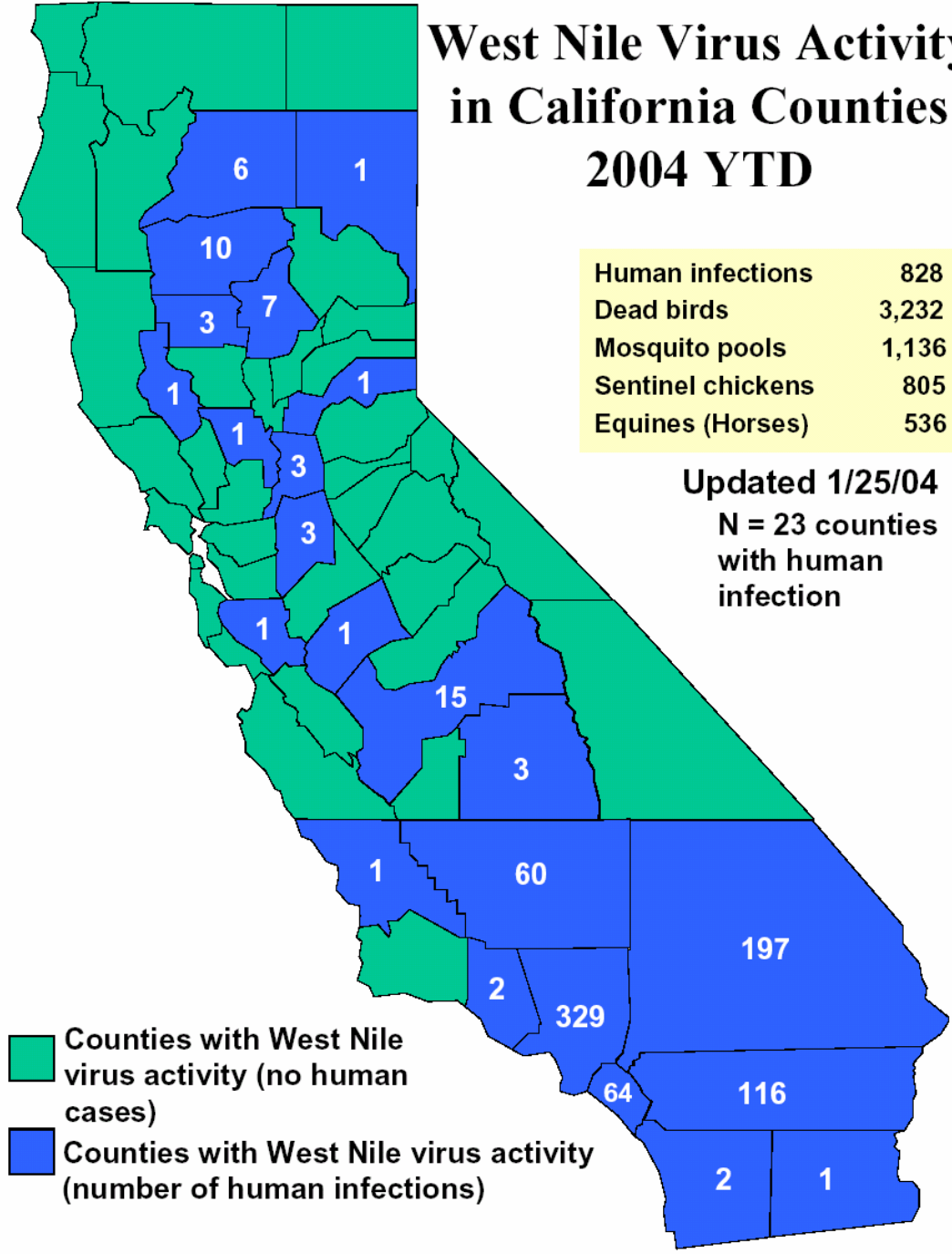
Data Sources:
Block group-level population and land area estimates
United States Census Bureau (2000)
Coverages of mosquito control agencies
Mosquito and Vector Control Association of California (Various)

Created Spring 2004 University of California Davis - School of Veterinary Medicine - Wildlife Health Center

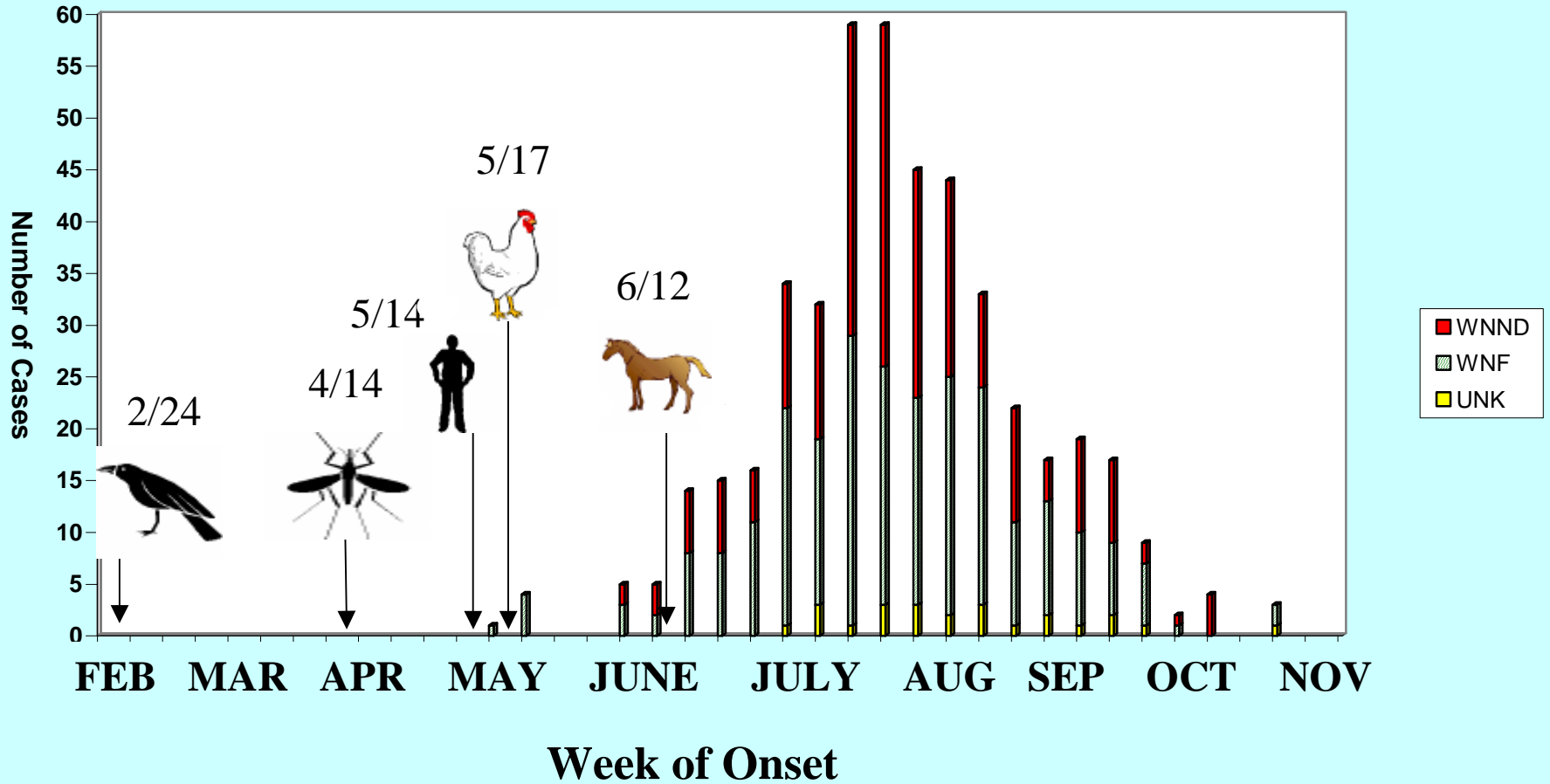
West Nile Virus Activity in California Counties 2004 YTD

Human infections	828
Dead birds	3,232
Mosquito pools	1,136
Sentinel chickens	805
Equines (Horses)	536

Updated 1/25/04
N = 23 counties
with human
infection



Human West Nile Virus Cases California, 2004



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

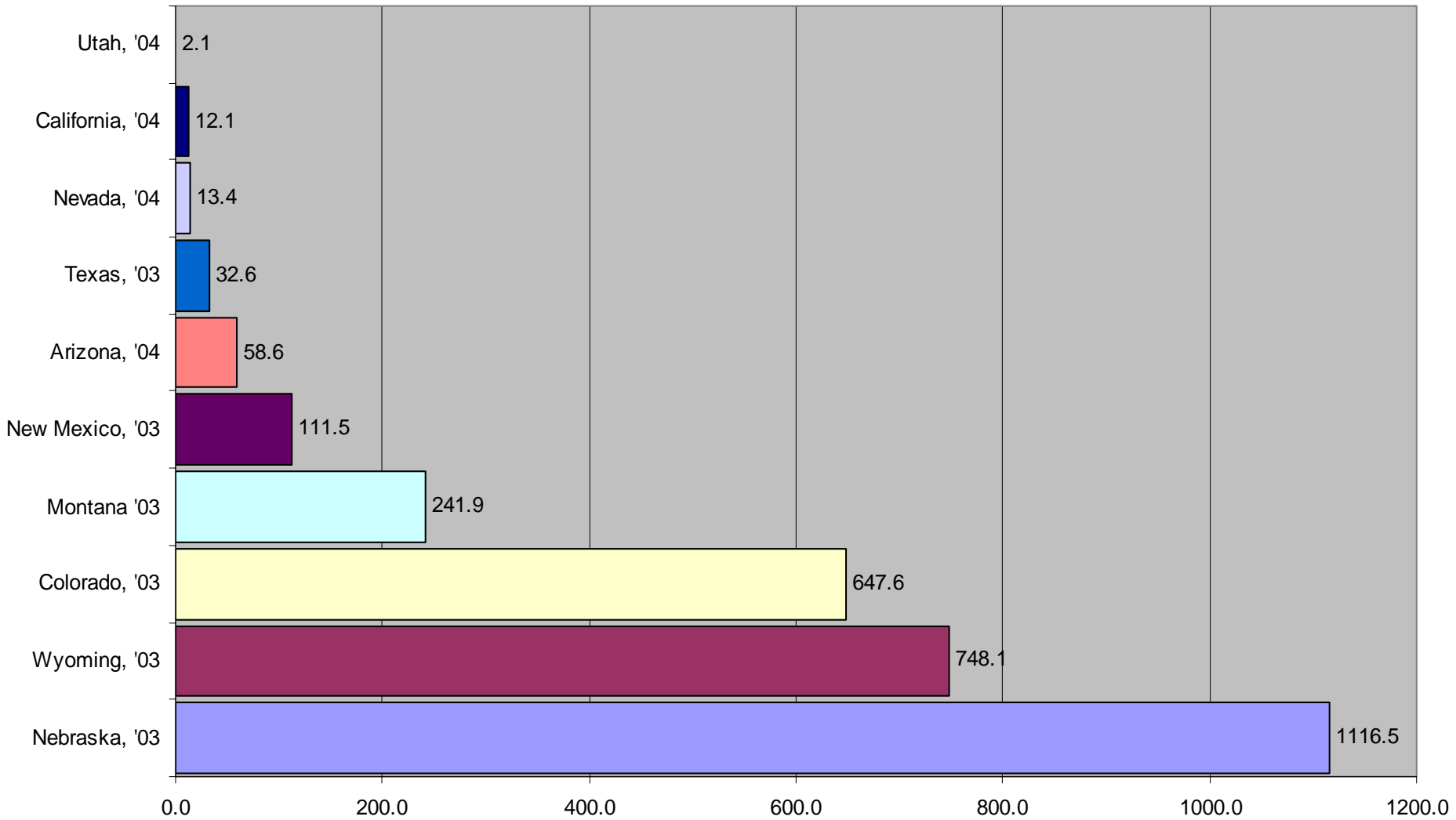
Importance of WNV Dead Bird Surveillance Program

- Dead bird surveillance was important for early WNV detection
 - Earliest indication of WNV activity in 91% (53/58) of California counties in 2004
- Dead bird surveillance system widely used by public / education tool
- Dead bird *reports* also gave an indication of WNV activity

Importance continued

- Only surveillance element that covered ALL 58 counties
 - Mosquito pool and sentinel chicken testing limited to only those areas with established mosquito control programs.
- There were 22 counties that had dead birds as the only evidence of WNV activity in 2004.

Cases per million people



County	Population (in millions)	Human Case	Incidence per 100,000
Maricopa, AZ	3.07	346	11.27
San Bernardino, CA	1.86	197	10.59
Riverside, CA	1.78	115	10.59
Los Angeles, CA	9.87	328	3.32
Orange, CA	2.97	64	2.15

In Summary

- Mosquito control agencies have been effectively protecting public health for many years; WNV has brought programs back to forefront
- California has a comprehensive mosquito-borne disease surveillance program that has monitored mosquito abundance and mosquito-borne virus activity since 1969
- Public's continued ability to work and enjoy the outdoors with very low incidence of disease is testimony of programs success



MOSQUITO AND VECTOR CONTROL ASSOCIATION OF CALIFORNIA

- BYLAWS
- JOIN MVCAC
- CONTACT US
- OUTSIDE LINKS
- MEMBERSHIP BENEFITS

Mission Statement

MVCAC -- quality public information, comprehensive mosquito and vector borne disease surveillance, training to high professional standards, effective legislative advocacy.



- Calendar of Events
- Press Room
- Board of Directors
- Member Agencies
- Committees
- Continuing Education
- Publications
- Job Listings
- California Vectorborne Disease Surveillance System

Members-Only Section:

* Guidelines for Critical Management for Small Wetland Sites

MON IN

MVCAC 2005 Annual Conference Info

WNS VectorBorne Portal
 Resources for WNV Testing of Birds
 DOWNLOAD IT HERE

Extra/Extra!
 Joining on a Story? Visit the
 MVCAC PRESS ROOM >>>>

West Nile Virus PSAs featuring Lindsay Wagner Lauded Statewide
 - View Here

- MVCAC News Archives
- Issue Briefs
- MVCAC News & Info



Want to be notified of updates to this site?

Click here

LEGISLATION

ERAF Exemption Granted

Find Your Legislator

How to Track a Bill

MVCAC
 660 J Street, Suite 480
 Sacramento, CA 95814
 (916) 440-0826
Mvcac@mvcac.org
www.mvcac.org

Chris Voight - Executive Director

How toxic are the pesticides we use?

