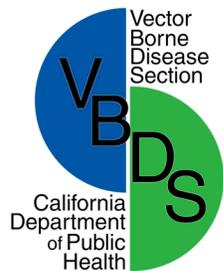


The California DYCAST System

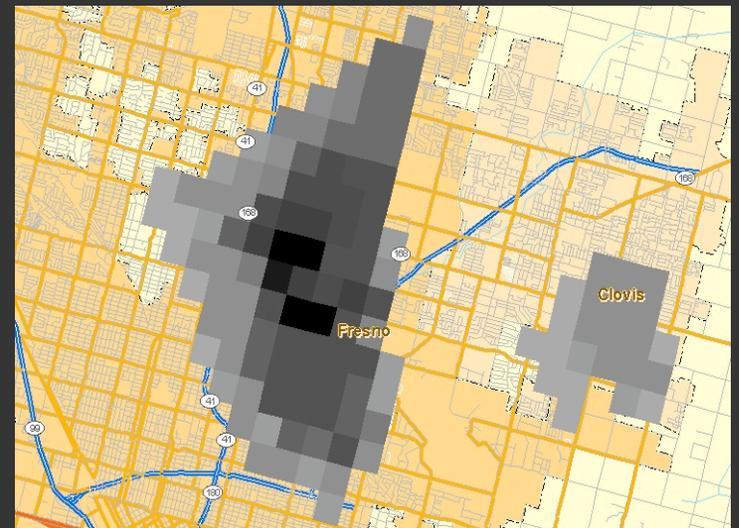
Erin Parker, MPH

WNV Dead Bird Surveillance Coordinator
California Department of Public Health



Dynamic Continuous-Area Space-Time system (DYCAST)

A modeling program that applies statistical and geographic analyses to dead bird reports to forecast times and places with an elevated risk of human WNV transmission



GOALS

- Identify and analyze dead bird clusters
- Determine lag time between peak bird deaths and human West Nile virus infection
- Predict times and places of human infection
- Assist with targeted mosquito control and public education campaigns



Utilized in New York City ('01-'02) and Chicago ('02)

How DYCAST Works

WEBSITE ADMIN | BIRD REPORTS AND SUBMISSIONS | DFG REPORTS | BIRD TESTING | REPORTS | FEVER STUDY | DYCAST | NOTIFICATIONS

Report Lookup

Search by... Report ID Search Quicklist...

REPORT INFO

Report not entered in database

Operator: Erin Parker

Date: Dec 4 2007

Time: 2 54 PM

Report source: Live Call

Zip Code:

Caller Name:

Phone ext:

2nd Phone ext:

Address 1:

Address 2:

City:

County: Please Select

Cross streets:

BIRD INFO

Number of Bird(s): 1

Species: Unknown

Condition: Unknown

Zone: Unknown

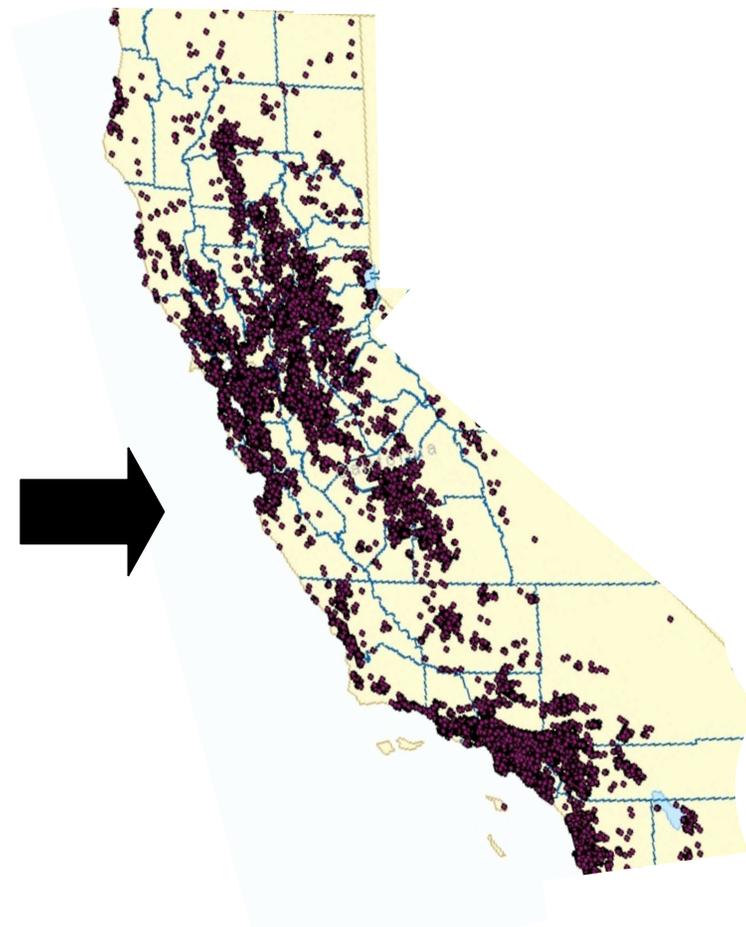
Has AI Question?:

AI Questions: Please Select

Reference: Unknown

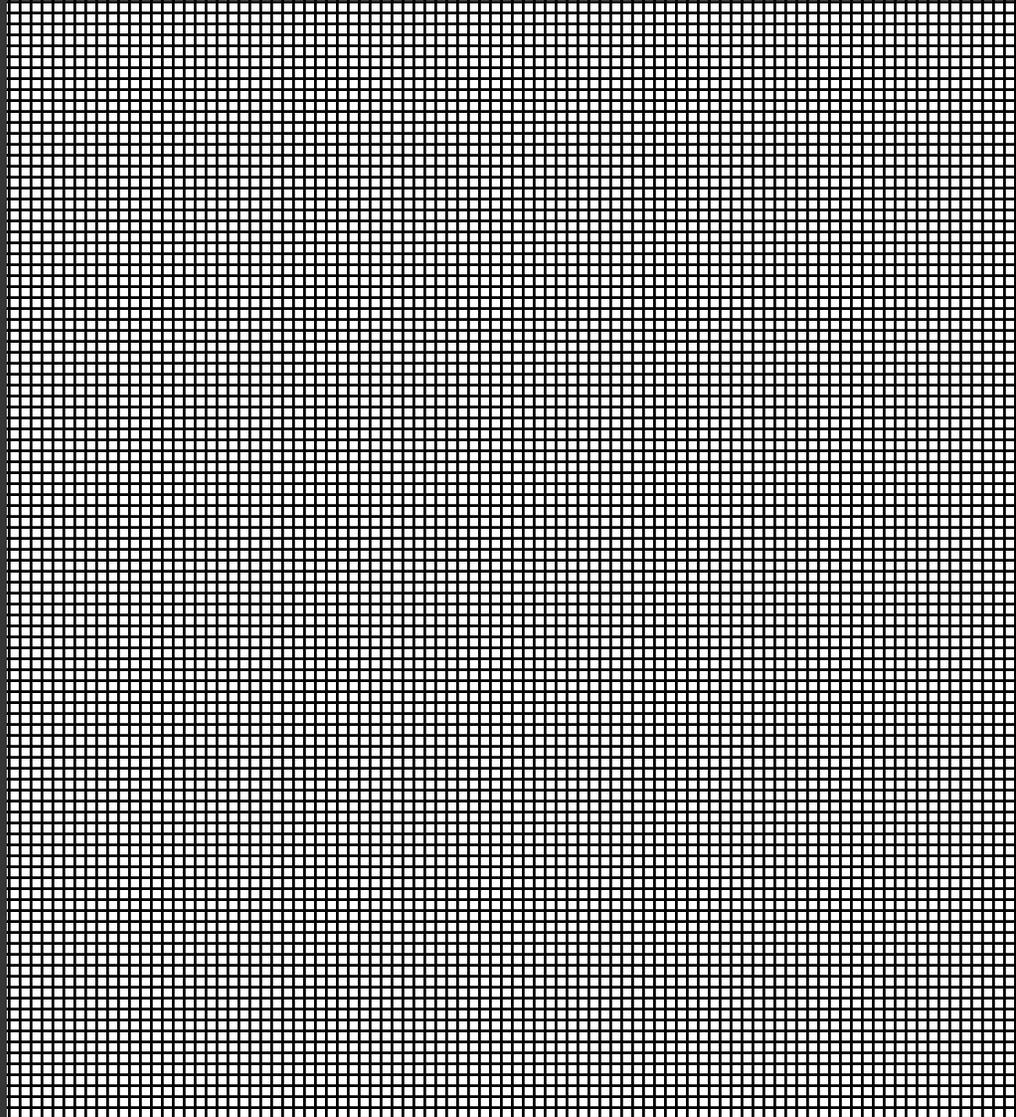
Notes:

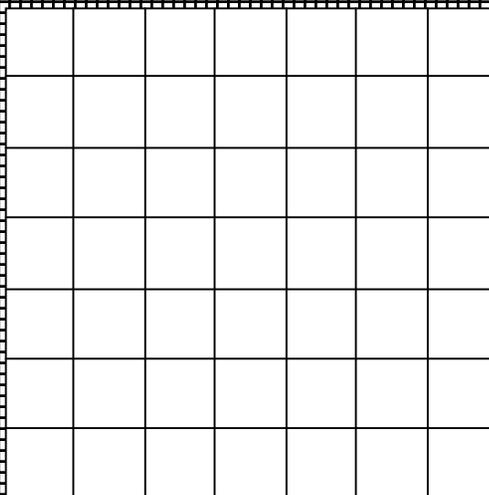
Report Only Report and Submit



Step 1: Dead bird reports are geocoded

Step 2: Analysis grid of quarter-mile square tiles is laid over the entire state





0.5 mi

Step 3: Each ¼ mile tile is analyzed to check if bird reports are “close” in space and time

MEASURES OF SPACE TIME INTERACTION THE KNOX TEST (1963)

$$N = \frac{n(n-1)}{2}$$

Where:

N : the total number of pairs that can be formed from:
 n data points

$$T = \sum_{i=1}^{n-1} \sum_{j=i+1}^n t_{ij} s_{ij}$$

Where:

T : the test statistic

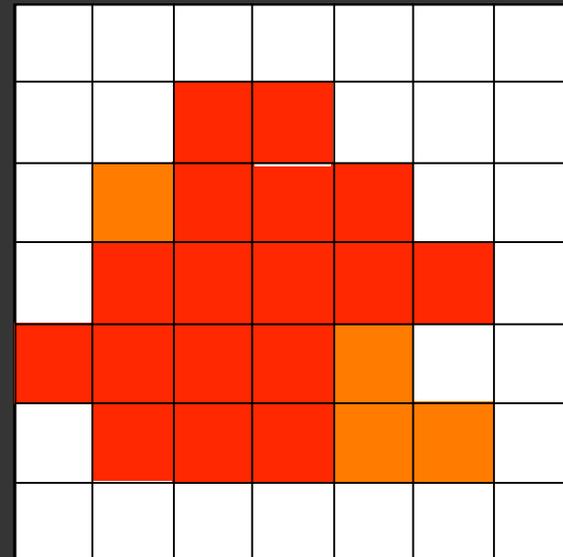
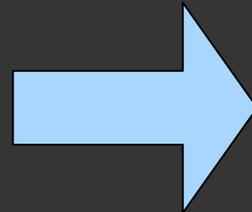
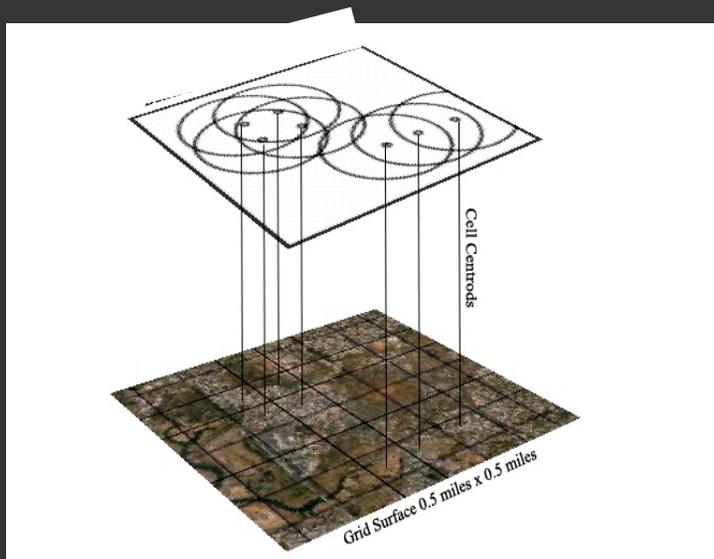
t_{ij} : the distance between points i and j : 0 if greater than the critical distance, 1 otherwise

s_{ij} : the time between points i and j : 0 if greater than the critical time, 1 otherwise

		SPACE	
		Close	Not Close
TIME	Close	$T(o_{11})$	$Time\ Only\ (o_{12})$
	Not Close	$Space\ Only(o_{21})$	$Not\ Close(o_{22})$

Step 4: Tiles with statistically close dead bird reports are “lit” on the map.

Designation	p-value	tile color
Low Risk (<i>unlit</i>)	> 0.1	n/a
High Risk (<i>lit</i>)	$0.1 - 0.05$	orange
High Risk (<i>lit</i>)	≤ 0.05	red



Real Time Alerts

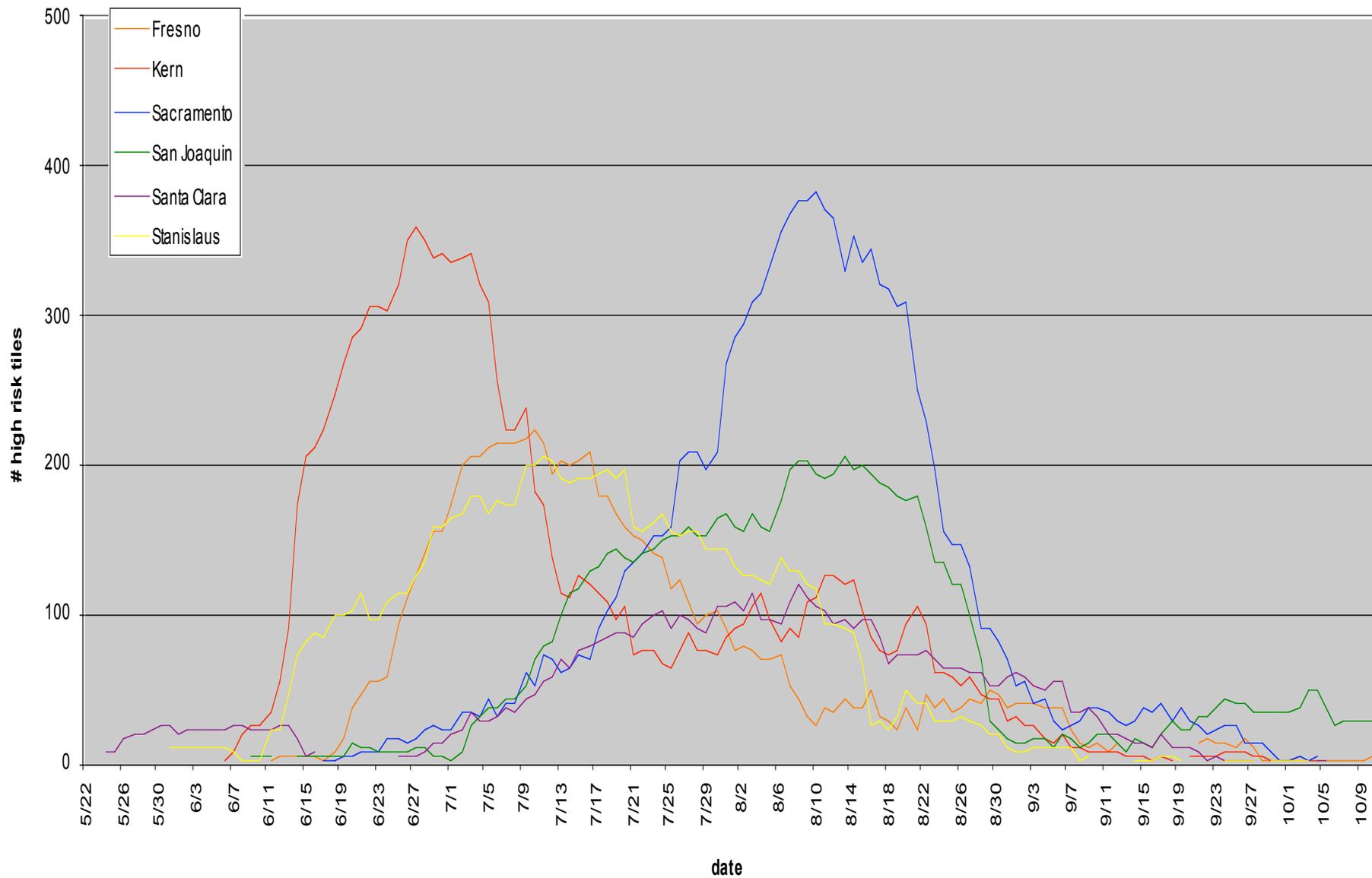
- Provides control agencies with real-time alerts of substantial and/or rapidly increasing risk in order to aid in policy-making decisions
- Criteria for alert
 - Substantial magnitude, or size, of risk area (s)
 - Accelerated rate of spatial expansion

Presence of both factors indicates extremely high risk of WNV
- District basis as needed
- 39 alerts sent in 2007

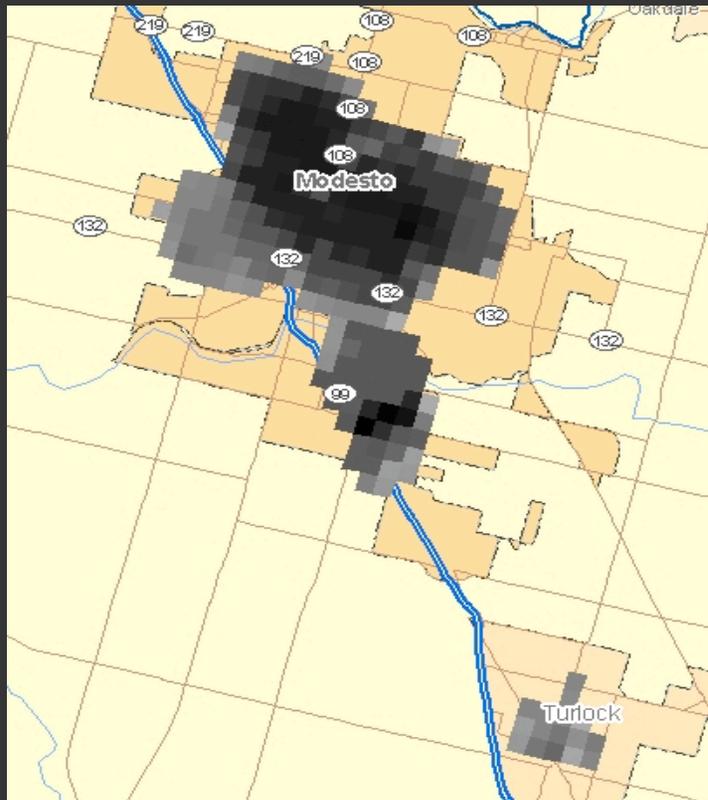
- ❑ Cannot make quantitative predictions based upon historical data

- ❑ Interpretation of DYCAST results must be done on a county-by-county basis, due to disparities in:
 - control efforts
 - public reporting
 - seasonal transmission
 - demographics
 - ecology
 - environment

DYCAST RISK: Top 6 Counties, 2007

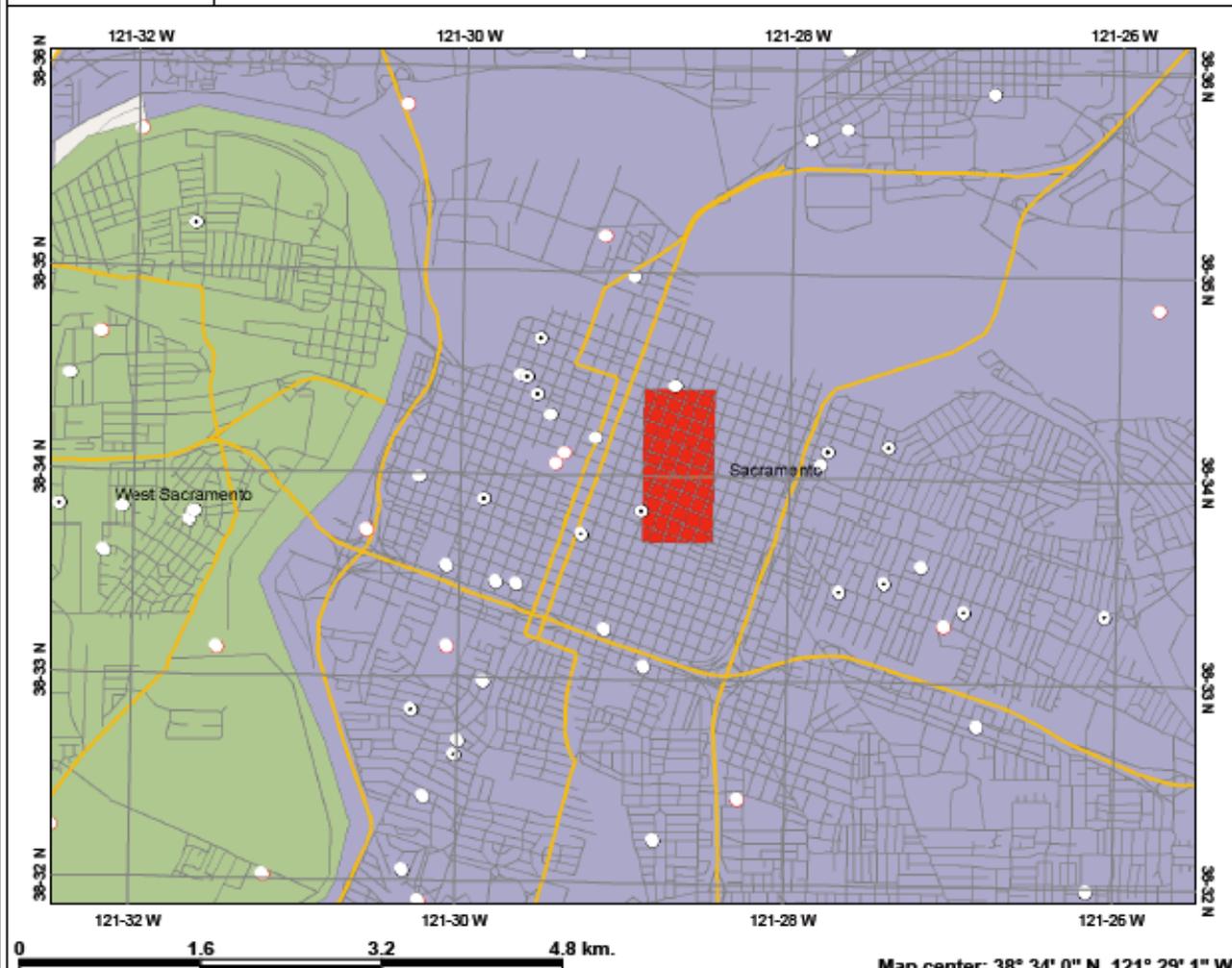


In 2007



DYCAST identified areas of high WNV risk in 26 counties. In 19 (73%) of those counties, the first DYCAST risk area identification preceded the first human case detection in that county by 1-118 days.

DYCAST Risk: Sacramento Co.; 4-10-08



Legend

- ★ Latest Positive Mosquito Pools
- ★ Latest Positive Chickens
- YTD Positive Dead Birds
- YTD Positive Mosquito Pools
- YTD Positive Chickens
- Mosquito Pool Sites
- Sentinel Chicken Sites
- Surveillance Sites
- ⊙ Past 21 Days Reported Dead Birds
- YTD Reported Dead Birds
- Interstates and Highways
- DYCAST High Risk ($p \leq 0.05$)
- DYCAST High Risk ($p \leq 0.1$)
- Counties
- ▒ Lakes and Rivers
- ▒ States
- ▒ Other countries
- ▒ Ocean

0 1.6 3.2 4.8 km.

Map center: 38° 34' 0" N, 121° 29' 1" W

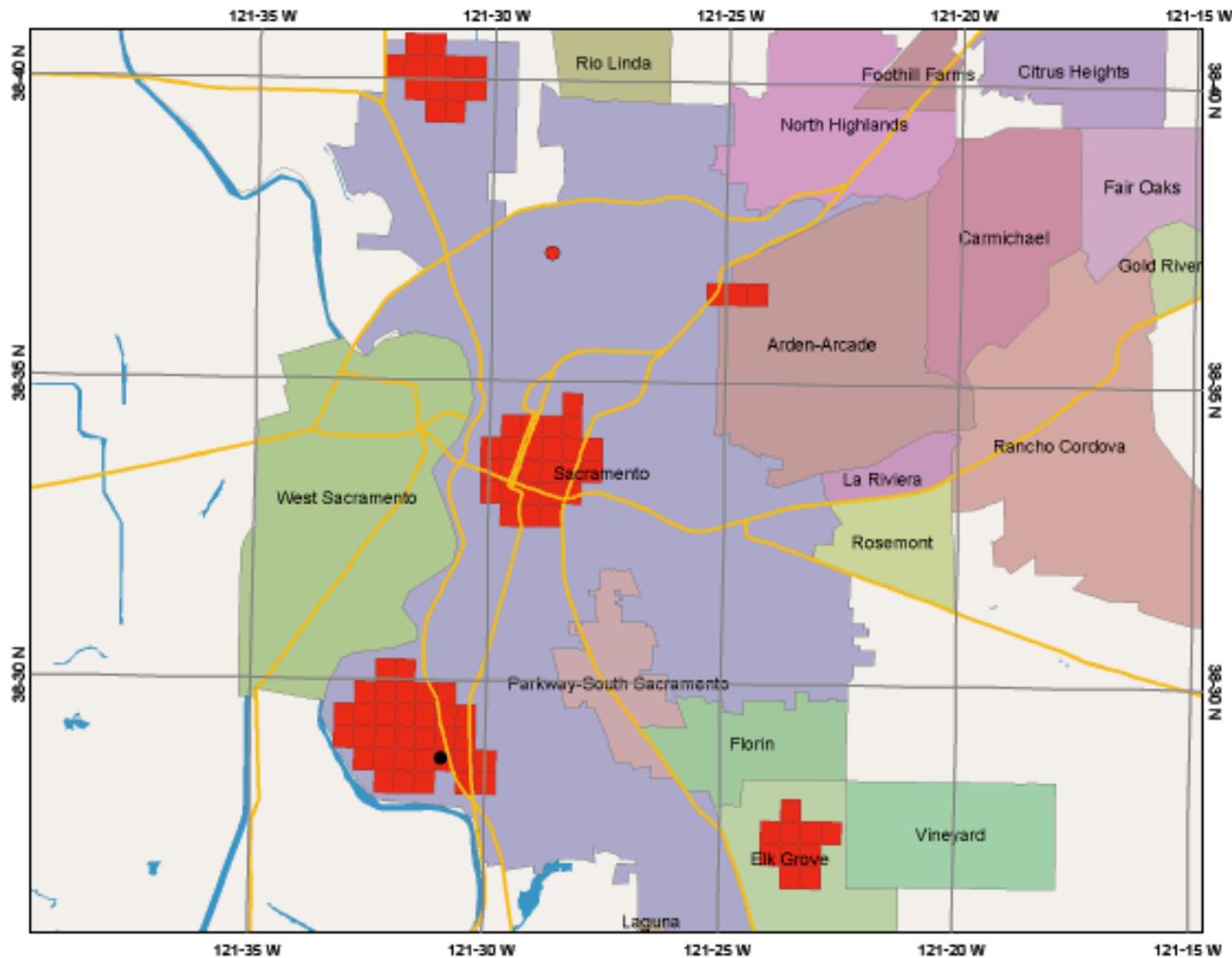


Scale: 1:54,548

This map is a user generated static output from the map component of the California Vectorborne Disease Surveillance Gateway (CSG) and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

Notes: High Risk Area= .5 sq. miles

DYCAST Risk: Sacramento Co.; 6-25-08



Legend

- ★ Latest Positive Mosquito Pools
- ★ Latest Positive Chickens
- YTD Positive Dead Birds
- YTD Positive Mosquito Pools
- YTD Positive Chickens
- Mosquito Pool Sites
- Sentinel Chicken Sites
- Surveillance Sites
- ⊗ Past 21 Days Reported Dead Birds
- YTD Reported Dead Birds
- Interstates and Highways
- DYCAST High Risk ($p \leq 0.05$)
- DYCAST High Risk ($p \leq 0.1$)
- Counties
- Lakes and Rivers
- States
- Other countries
- Ocean

Map center: 38°33' N, 121°27' W

Scale: 1:195,272

0 5.75 11.5 17.25 km.

This map is a user generated static output from the map component of the California Vectorborne Disease Surveillance Gateway (CSG) and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

Notes: High Risk Area= 21 sq. miles

Top 10 Counties with DYCAST Risk, 2008 YTD

1. Kern
2. Tulare
3. San Joaquin
4. Sacramento
5. Orange
6. Fresno
7. Placer
8. Stanislaus
9. Contra Costa
10. Los Angeles

Viewing DYCAST on the Surveillance Gateway

If you need access to the Gateway please
contact Bborie Park at bkpark@ucdavis.edu

DHS Reports

[Report State Testing](#)

[Local Test Results](#)

GIS Tools

[Geocode Addresses](#)

[ArcGIS Surveillance Maps](#)

[Google Earth Layers](#)

Import/Export Data

[Bulk Import Datasets](#)

[Export Surveillance Data](#)

Other Utilities

[Determine Disease Weeks](#)

[Set Active Year](#)

To view DYCAST, log onto the Gateway <http://gateway.calsurv.org/> then go to “tools” on the menu bar followed by “GIS Tools: ARCGIS Surveillance Maps”

CALSURV California Vectorborne Disease Surveillance Maps

About Layers Legend Locate Key Map Bookmarks Create PDF Help Exit

Jump To: By Method

Map Layers

[Feedback](#)

- Chickens
 - Sentinel Chicken Sites
 - Latest Positive Chickens
 - YTD Positive Chickens
- Mosquitoes
 - Mosquito Pool Sites
 - Latest Positive Mosquito Pools
 - YTD Positive Mosquito Pools
- Dead Birds
 - DYCAST Human Risk
 - YTD Positive Dead Birds
 - YTD Reported Dead Birds
 - Last 21 Days Reported Dead Birds
- Surveillance Sites
- Geographic Features
- MVCAC Data

Automatically Refresh Map

Notes:
Please refer to the following for descriptions of the functions of the controls in the layer list above.

Scale: 1:2,636,628 **go** Map Tool: **Zoom In** Active Layer: * NO ACTIVE LAYER * [View DYCAST Data](#)

Zoom in on the map using the  tool...let's zoom in on Sacramento County.

CAL SURV California Vectorborne Disease Surveillance Maps
 About Layers Legend Locate Key Map Bookmarks Create PDF Help Exit

Jump To: By Method

Map Layers [Feedback](#)

- Chickens
 - Sentinel Chicken Sites
 - Latest Positive Chickens
 - YTD Positive Chickens
- Mosquitoes
 - Mosquito Pool Sites
 - Latest Positive Mosquito Pools
 - YTD Positive Mosquito Pools
- Dead Birds
 - DYCAST Human Risk
 - YTD Positive Dead Birds
 - YTD Reported Dead Birds
 - Last 21 Days Reported Dead Birds
- Surveillance Sites
- Geographic Features
- MVCAC Data

Automatically Refresh Map

Notes:
 Please refer to the following for descriptions of the functions of the controls in the layer list above.

Scale: 1:404,019 [go](#) Map Tool: [Zoom In](#) Active Layer: * NO ACTIVE LAYER * [View DYCAST Data](#)

Copyright © Environmental Health Services, University of California, Davis
 40.21021291837, -121.83111311131

After we zoom in, we can choose the map layers we want to have displayed by checking off relevant elements in the map layers tool bar. Note: to display DYCAST tiles, the map must be zoomed in to the county level. If the check box is grey you have not zoomed in far enough.

CAL SURV California Vectorborne Disease Surveillance Maps

About Layers Legend Key Map Bookmarks Create PDF Help Exit

Identify Results

Coordinate Position
Geographic: 38°36' N, 121°26' W

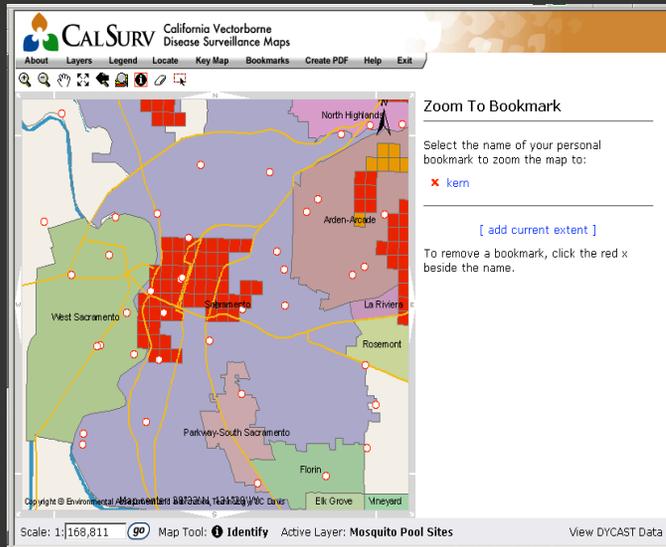
Mosquito Pool Sites

Mosquito Pool Sites
Site: SAYO4169
Latitude: 38-37-27
Longitude: 121-26-06
City: Sacramento
County: Sacramento

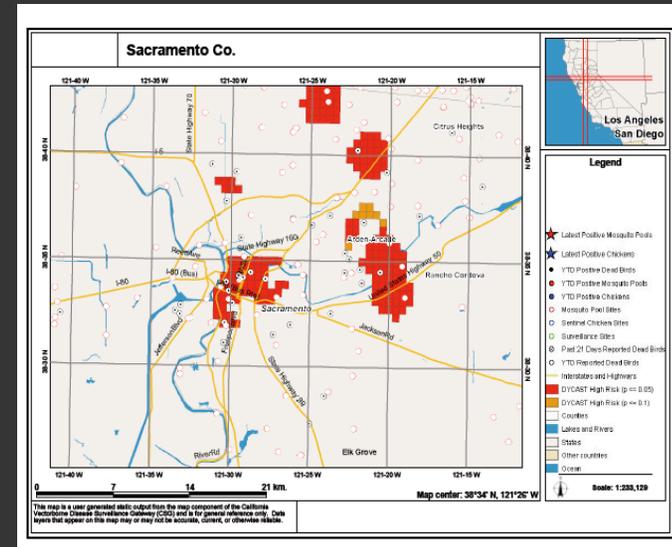
Scale: 1:168,811 go Map Tool: **i Identify** Active Layer: **Mosquito Pool Sites** View DYCAST Data

Clicking on the identify button, , allows you to see specific information on any layer. Here details on a mosquito pool are shown.

Other Features



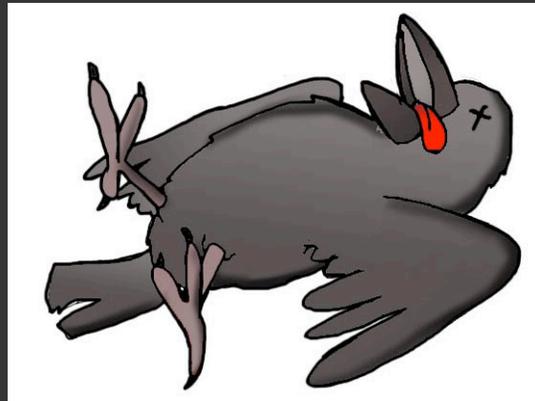
Bookmarks for your county



PDF Maps

A tutorial explaining details of the mapping system is available on the gateway. Just go to “help” on the map menu bar.

Advertising the hotline number is
critical for continued success with
DYCAST



1-877-968-2473

www.westnile.ca.gov

For More Information

Erin Parker, MPH

WNV Dead Bird Surveillance Coordinator

California Department of Public Health

Erin.parker@cdph.ca.gov

510-412-6254