USE OF GIS/GPS TECHNOLOGY IN MARICOPA COUNTY–VECTOR CONTROL (MCVC)

DAN DAMIAN

KIRK SMITH

WHAT IS GPS?

-GPS (Global Positioning System) is an aerospace technology that uses satellites and ground equipment to determine position anywhere on Earth

-GPS is the most significant recent advance in navigation and positioning technology

-In the past, the stars were used for navigation

-Today's world requires greater accuracy. The new constellation of artificial stars provided by the Global Positioning System serves this important need

WHAT IS GIS?

-**GIS** or **G**eographical **I**nformation **S**ystem, is any system that captures, stores, analyzes, manages, and presents data that are linked to a location

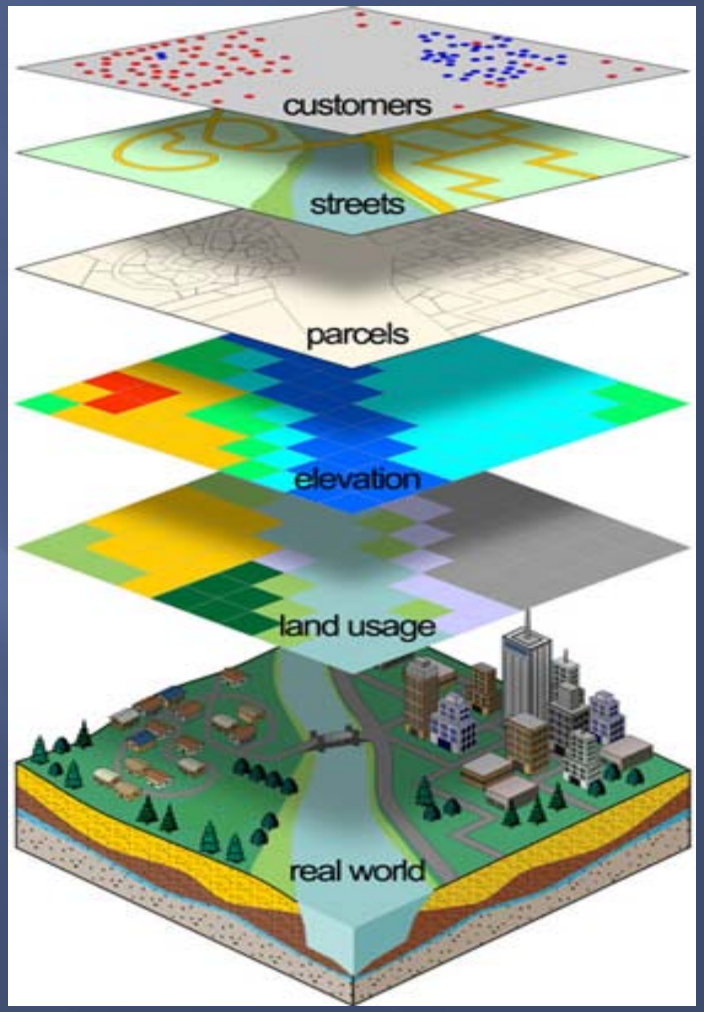
Comprehensive GIS require a means of:

-Data input, from maps, aerial photos, satellites, surveys, and other sources

-Data storage, retrieval, and query

-Data transformation, analysis, and modeling, including spatial statistics

-Data reporting, such as maps, reports, and plans



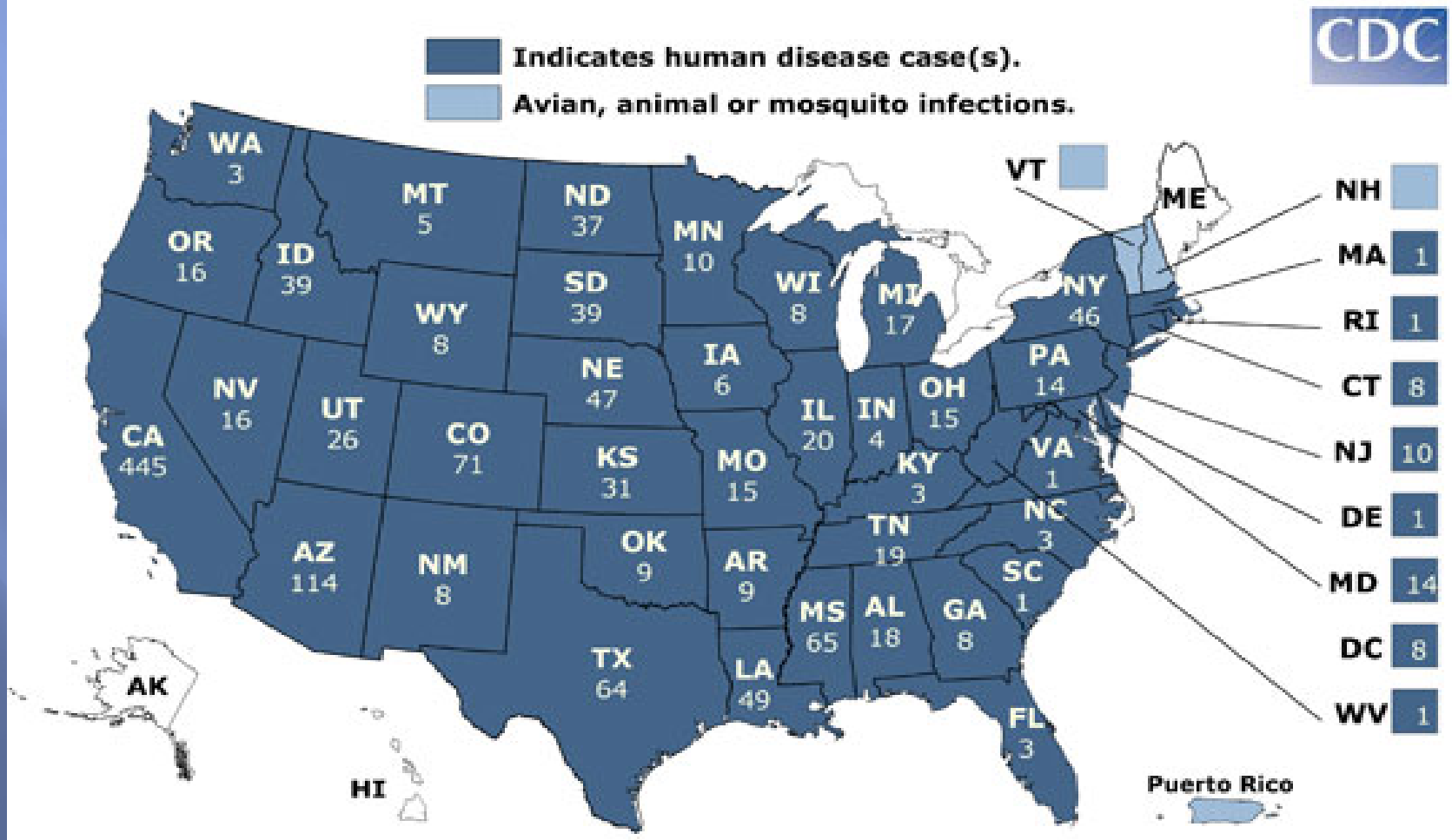
West Nile Virus Outbreak Facts

- American WNV outbreak begins in 1999
- End of 2004 – WNV reported in Arizona
- Maricopa County Vector Control Program created and later develops into a division of Environmental Services Department
- MCVC Primary Mission:
  Mosquito Population Control

Final 2008 West Nile Virus Activity in the United States

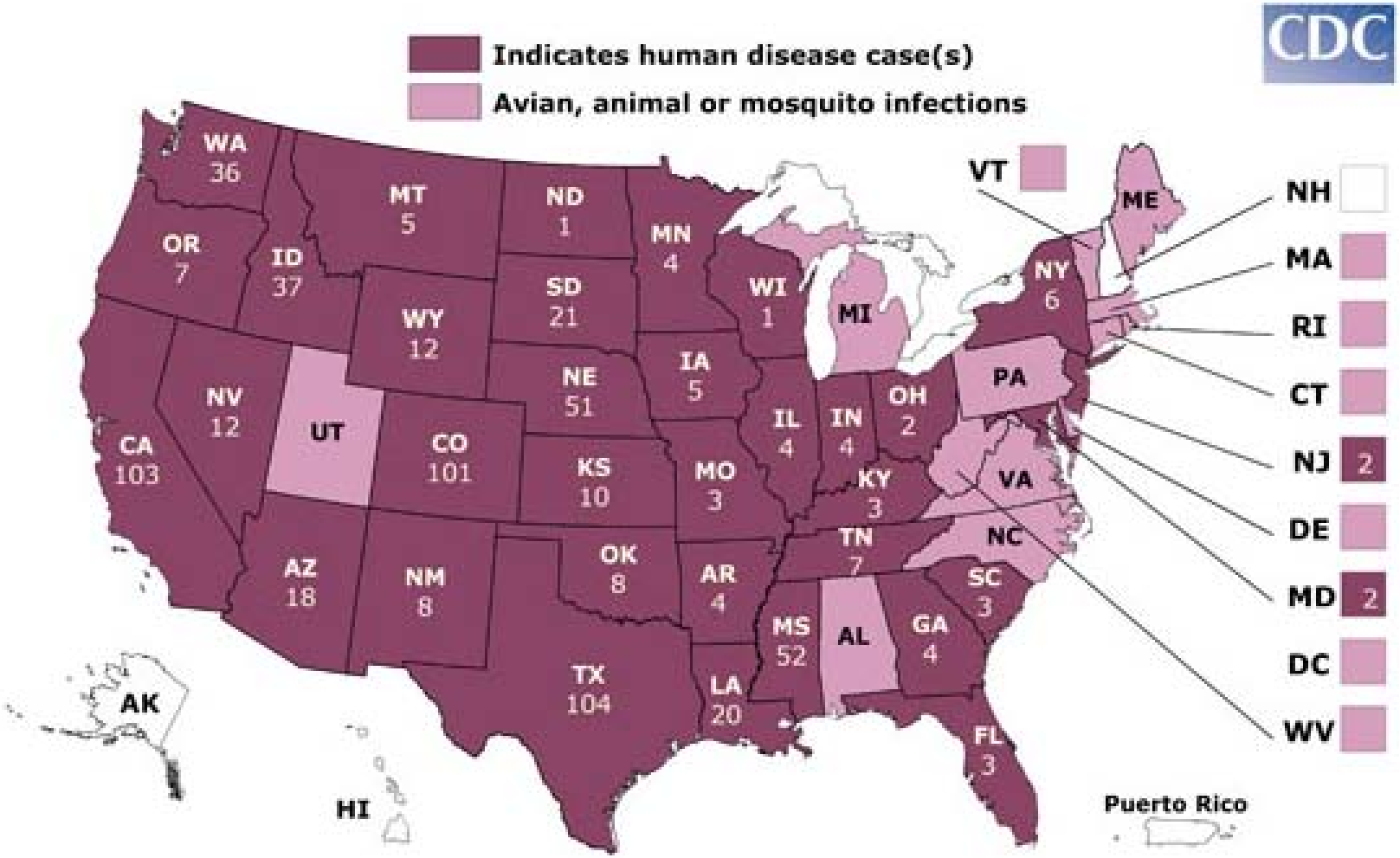
January 1, 2008 through December 31, 2008 as reported to CDC's ArboNET system for public

Click on the map for a printer friendly version.

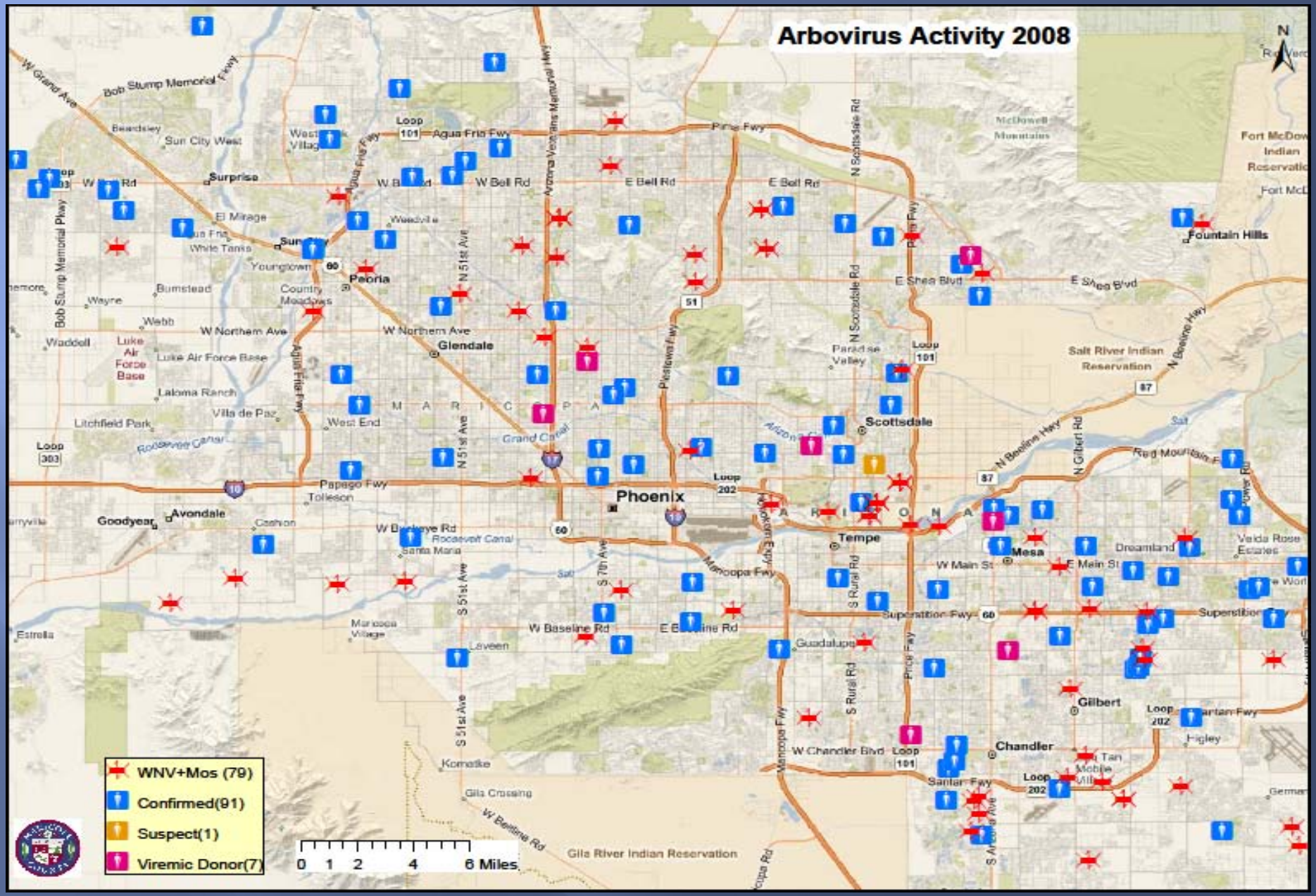


2009 West Nile Virus Activity in the United States (Reported to CDC as of December 8, 2009)

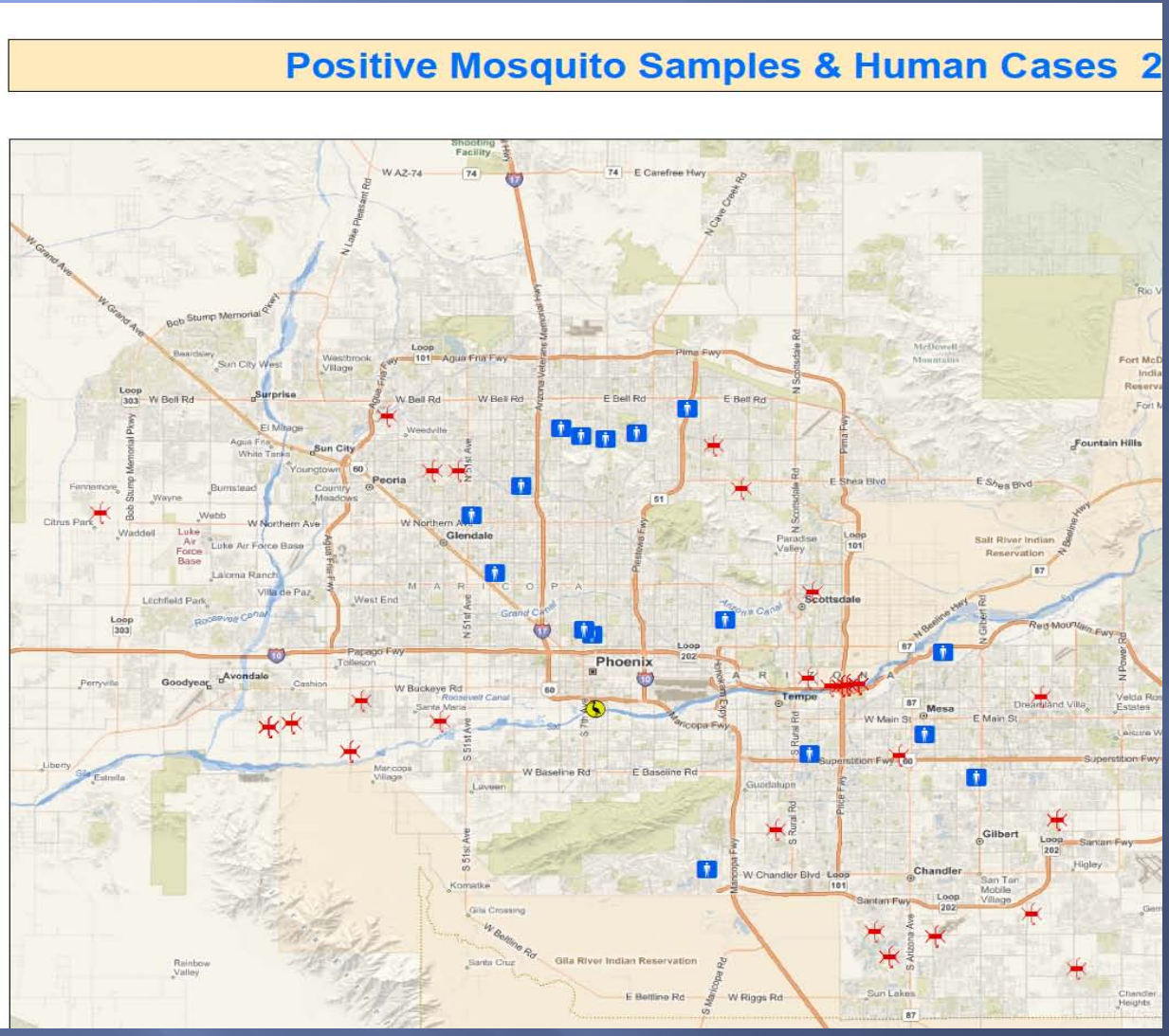
Click on the map for a printer friendly version.



2008 Maricopa County WNV Infection Data



2009 Maricopa County WNV Infection Data



Sample of GIS Application(Automatic Vehicle Location-AVL)

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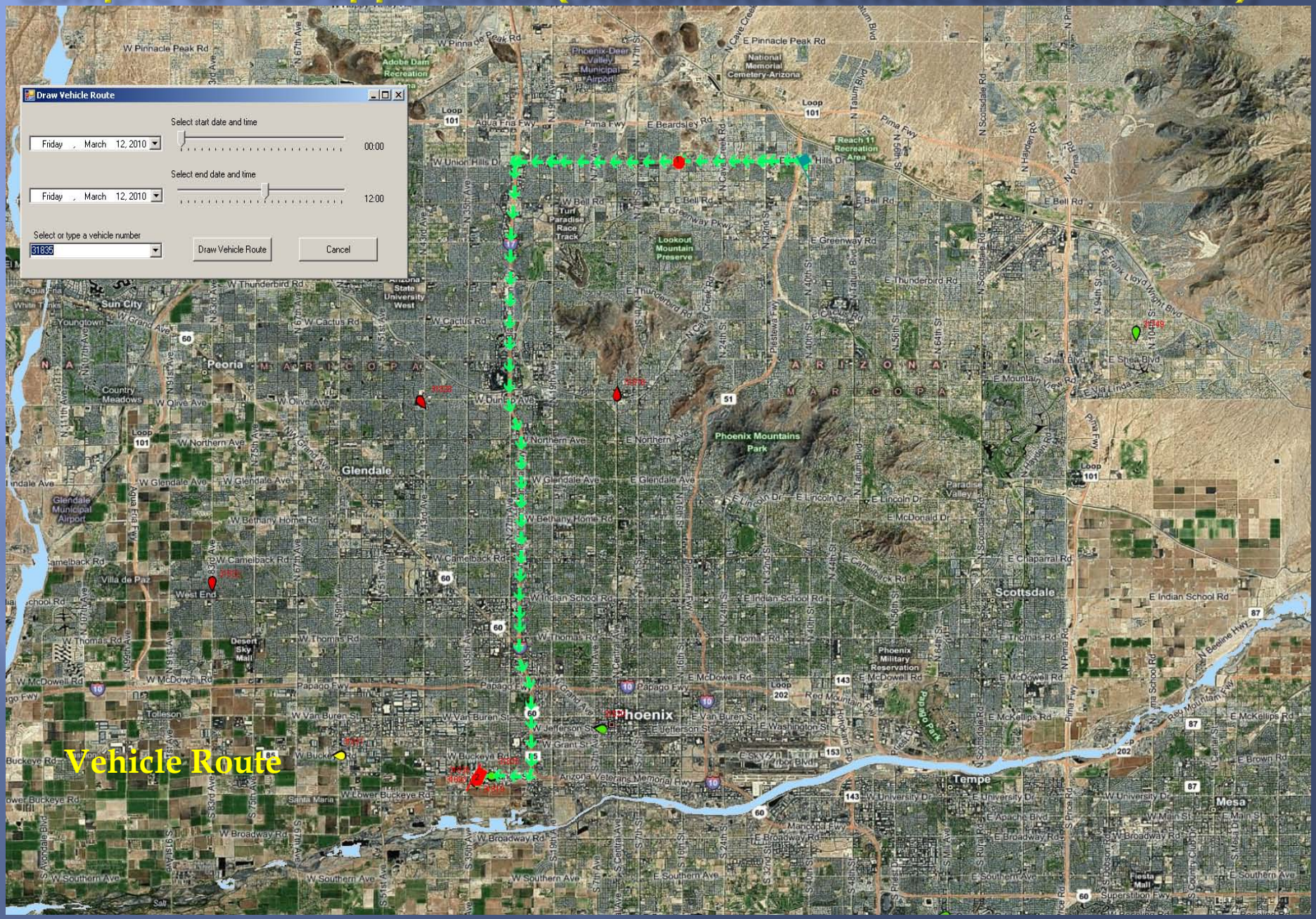

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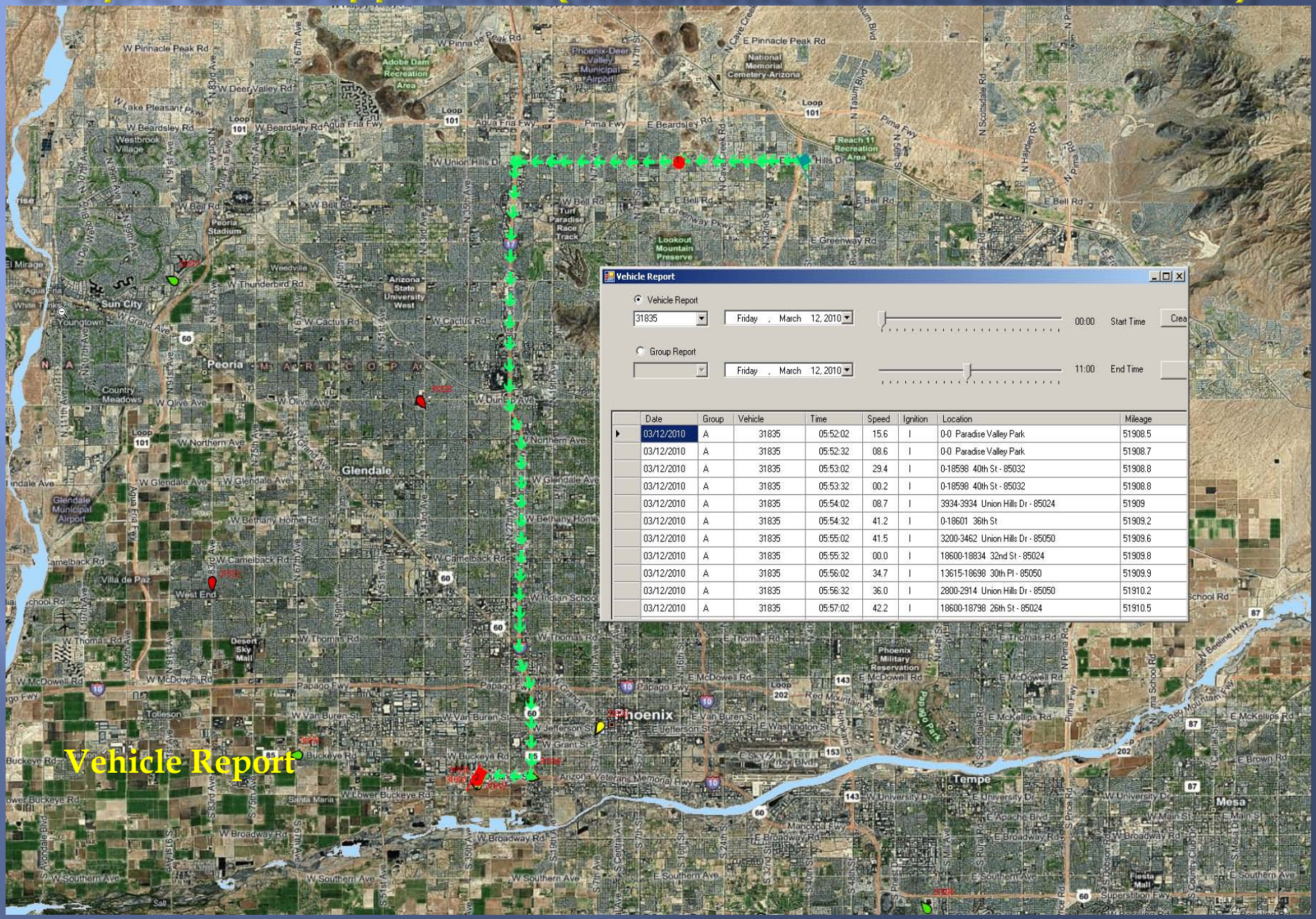


GIS USED IN ADULTICIDE OPERATION

Stages in Adulticide Treatment:

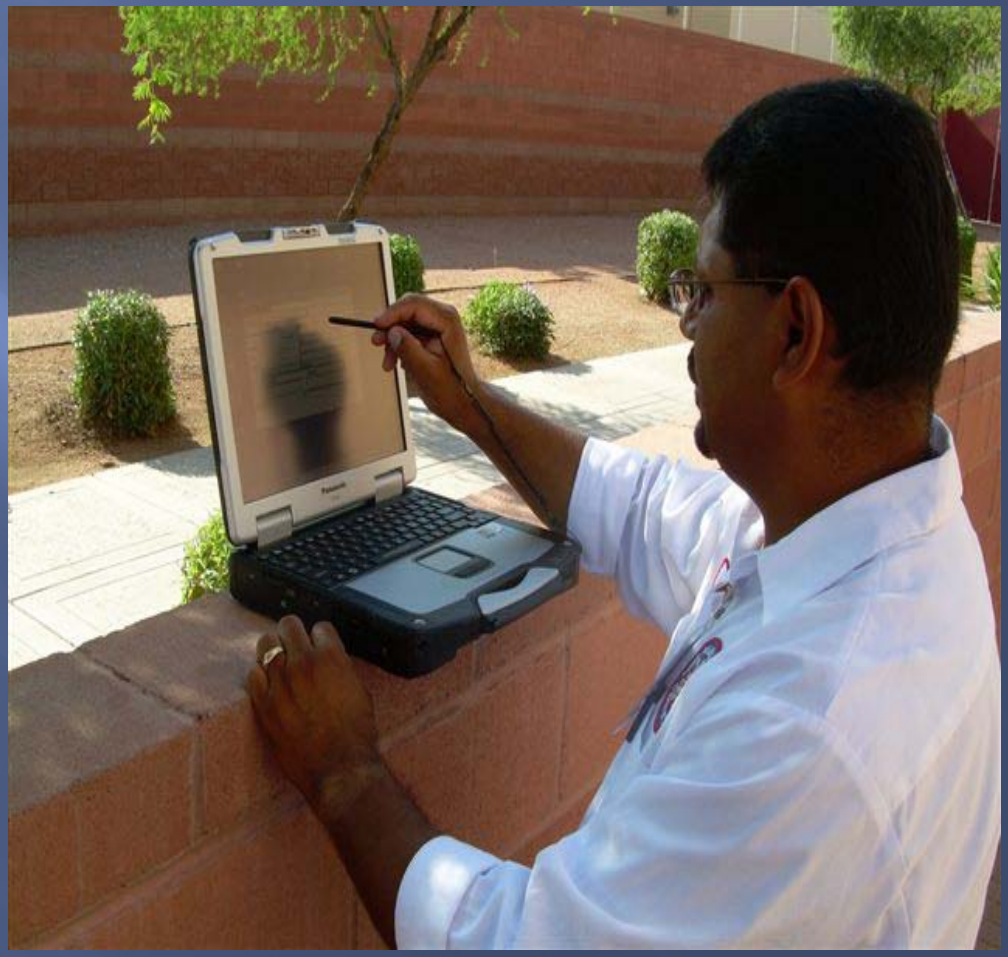
- Setting the overnight CO_2 traps
- Delivering trap samples to the lab
- Running RAMP tests on all trap exceedences
- Releasing the lab report
- Identifying the areas to be fogged
- Updating the Maricopa County website
- Notifying the chemical-sensitive people
- Performing the actual adulticide application

Overnight CO_2 Trapping

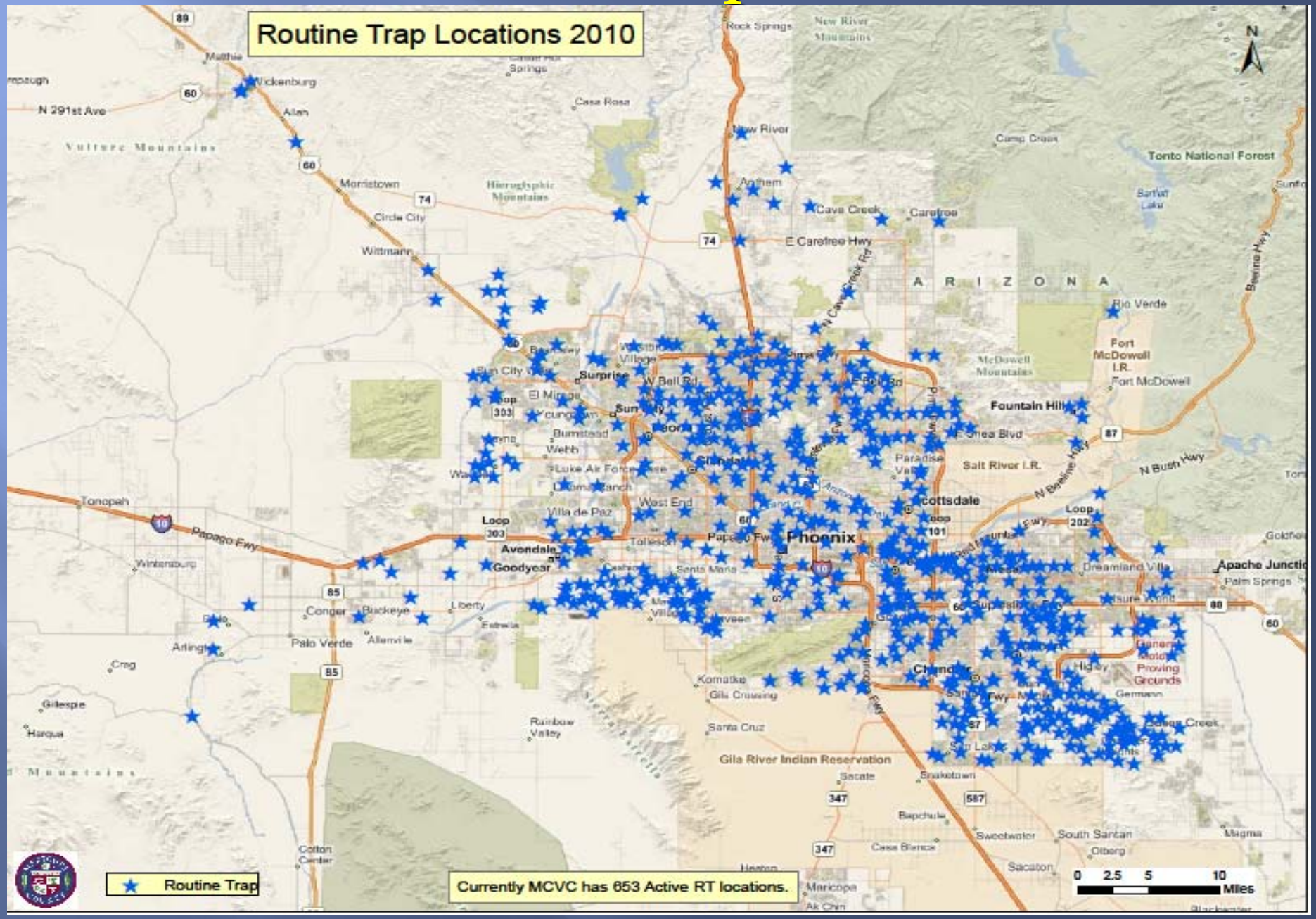
Trap is set in the area where public health hazard has been indicated by citizen complaints (*Special Trap*) or it is a known mosquito activity location (*Routine Trap*)

CO_2 Trapping- Data Collection

While setting the trap, the field technician will record the location details including GPS, habitat or land use.



Surveillance-Routine Traps 2010

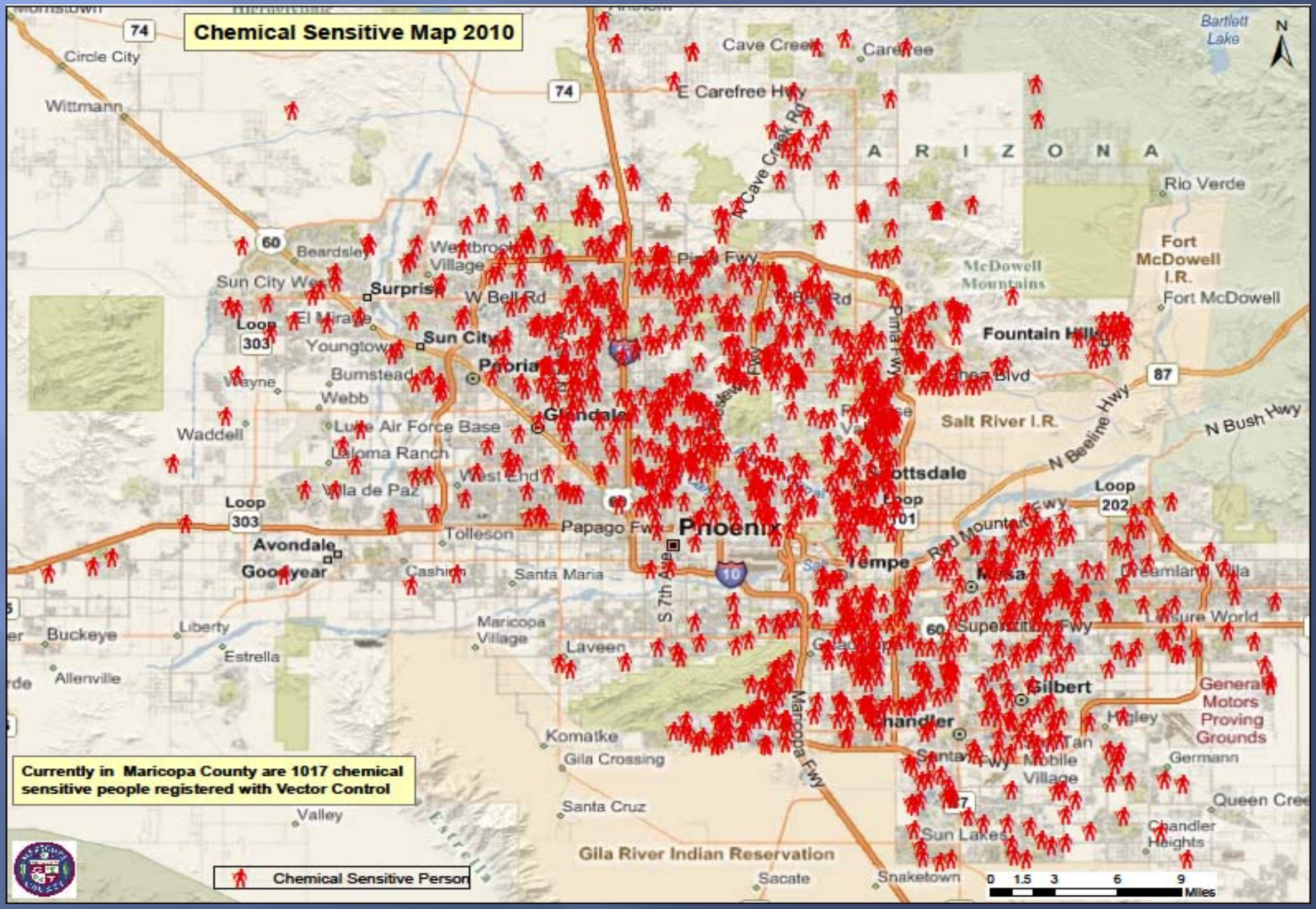

Routine Trap Locations 2010
Vickenburg
Morristown
Circle City
Wittmann
Surprise
El Mirage
Sun City
Peoria
Glendale
Phoenix
Scottsdale
Fountain Hill
Cave Creek
Carefree
New River
Anthem
Avondale
Goodyear
Tonopah
Palo Verde
Buckeye
Chandler
Gila River Indian Reservation
Tonto National Forest
Rio Verde
Fort McDowell I.R.
Salt River I.R.
Apache Junction
Dreamland Villa
Palm Springs
Sweetwater
South Santan
Sacaton
Maricopa
Casa Blanca
Santa Cruz
Komatke
Gila Crossing
Rainbow Valley
Cotton Center
Gilespie
Harqua
Winterburg
Arlington
Conger
Liberty
Allemite
Crog
Papago Fwy
Loop 303
Loop 101
Loop 202
Loop 60
Loop 10
Loop 87
Loop 85
Loop 74
Loop 89
Loop 347
Loop 587
Loop 80
Loop 68
Loop 69
Loop 93
Loop 303
Loop 202
Loop 101

Mosquito Sample Delivery

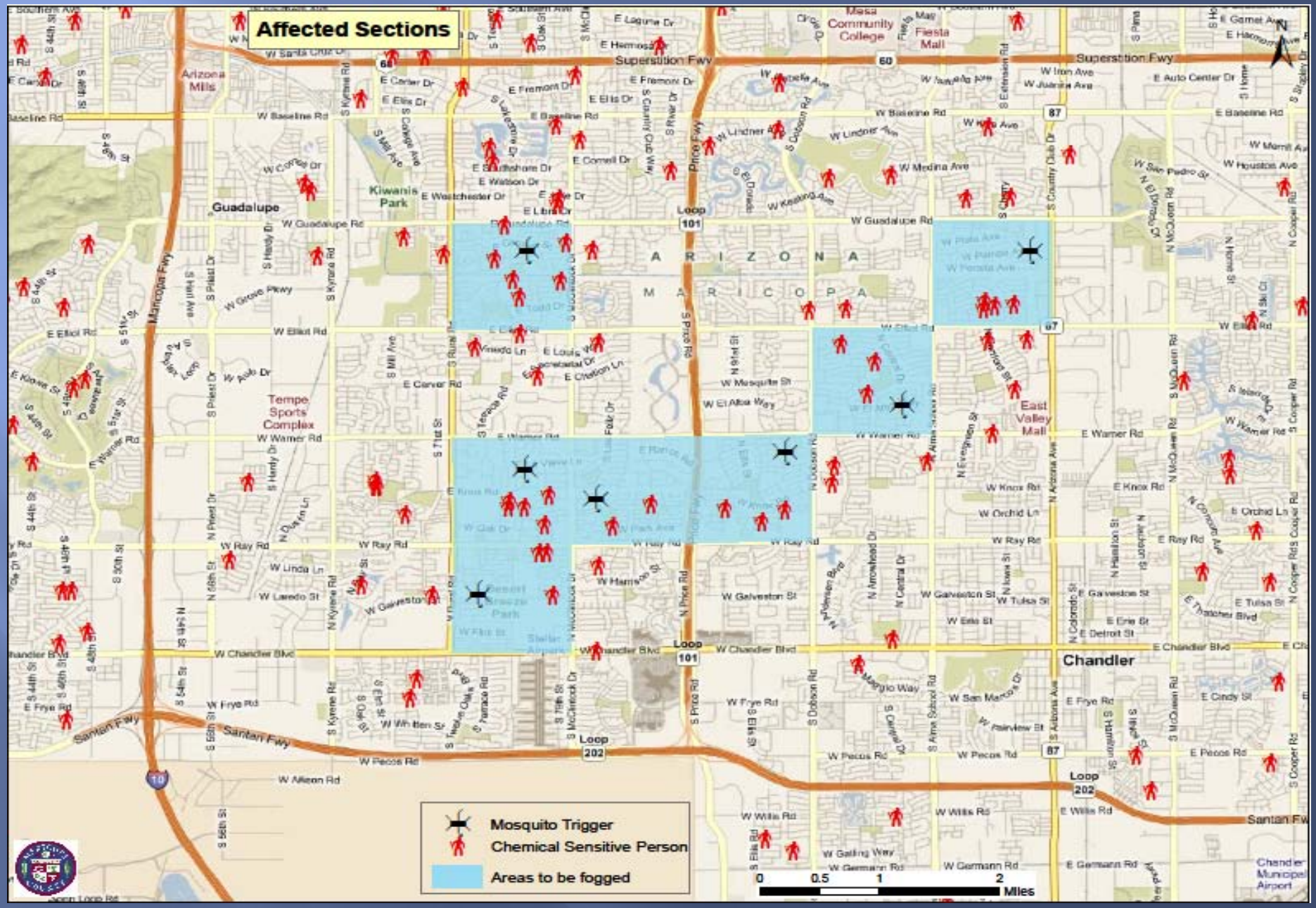
Laboratory WNV Triggers

- Any *Culex tarsalis* or *quinquefasciatus* sample larger than 30 mosquitoes/trap/night
- Any ‘floodwater' mosquitoes (*Psorophora columbiae*) sample larger than 300 mosquitoes/trap/night
- RAMP (Rapid Analyte Measurement Platform)- check WNV traces on mosquito pools. RAMP will test only *Culex* mosquitoes

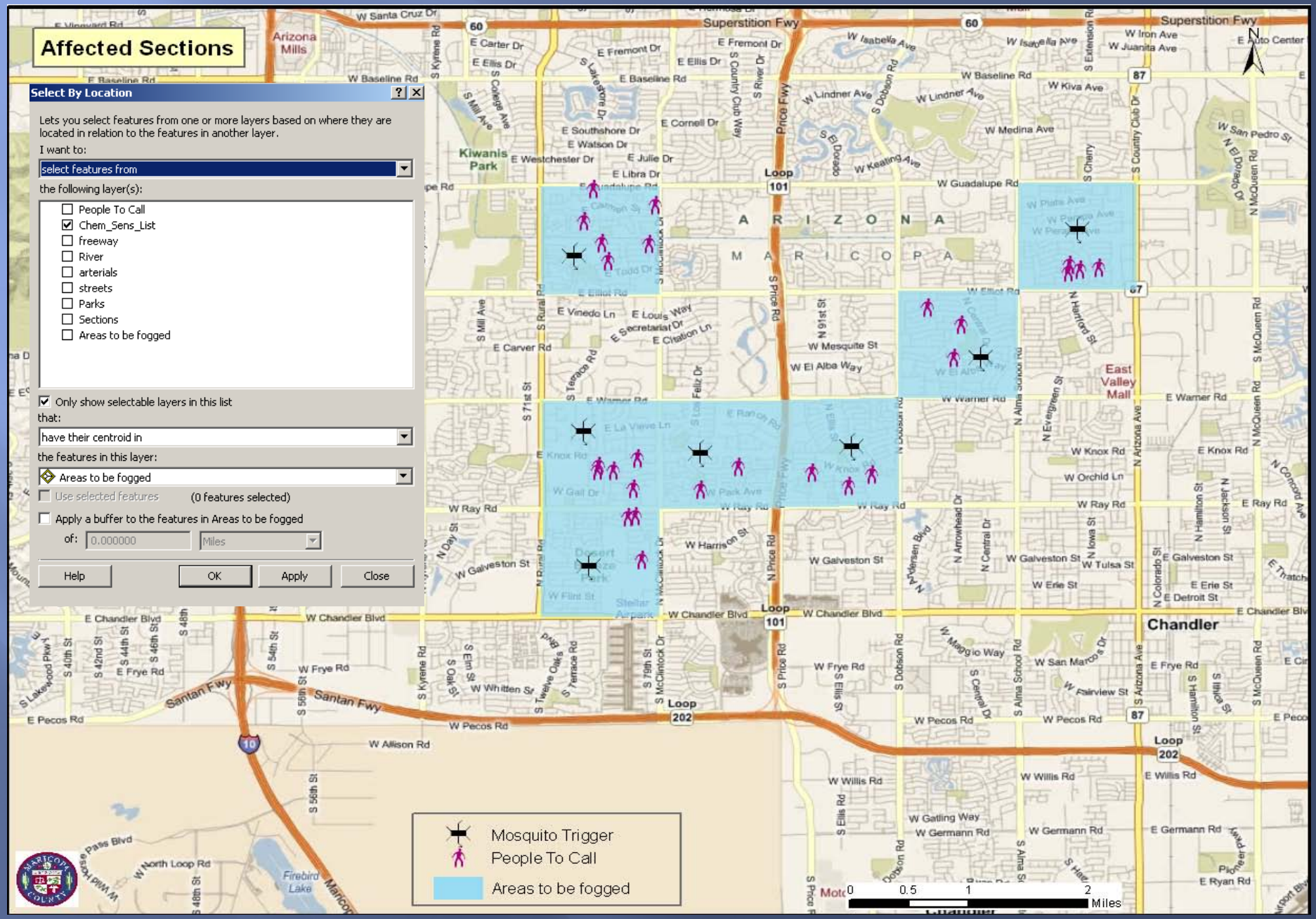
Chemical Sensitive People Map



Identifying the area to be fogged



Chemical Sensitive Selection



Chemical Sensitive Notification

MedVoice International, LLC.

Your Healthcare Messaging Partner

MedVoice File Transfer

Electronic Transfer Upload

Please enter the location and name of the file you wish to transfer. For example, to upload a file from your local hard drive named "Appointments.txt" that is located in a directory called "Transfer", you should enter "C:\Transfer\Appointments.txt"

If you do not know the specific location or name of the file, you may select the "Browse" button to find your file.

Once you have selected your file, please choose the "Send Files" button at the bottom of the form to send the file.

File 1 Browse...

File 2 Browse...

File 3 Browse...

File 4 Browse...

File 5 Browse...

File 6 Browse...

Send Files View Upload History

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Maricopa County Website Update

Calendar Maintenance

Add New Event

	Event ID	Date	Event Title	
Edit	6753	7/18/2008	Mosquito Adulticiding	Delete
Edit	6749	7/17/2008	Mosquito Adulticiding	Delete
Edit	6737	7/12/2008	Mosquito Adulticiding	Delete
Edit	6726	7/11/2008	Mosquito Adulticiding	Delete
Edit	6725	7/10/2008	Mosquito Adulticidine	Delete
Edit	6724	7/9/2008	Mosquito Adulticiding	Delete
Edit	6708	7/5/2008	Mosquito Adulticiding	Delete
Edit	6701	7/3/2008	Mosquito Adulticiding	Delete
Edit	6693	7/2/2008	Mosquito Adulticiding	Delete
Edit	6674	6/28/2008	Mosquito Adulticiding	Delete
Edit	6646	6/20/2008	Mosquito Adulticiding	Delete
Edit	6645	6/18/2008	Mosquito Adulticiding	Delete
Edit	6640	6/14/2008	fogging schedule	Delete
Edit	6637	6/12/2008	mosquito fogging	Delete
Edit	6631	6/8/2008	Mosquito Adulticiding	Delete
Edit	6630	6/7/2008	Mosquito Adulticiding	Delete
Edit	6623	6/6/2008	Mosquito Adulticiding	Delete
Edit	6616	6/5/2008	Mosquito Adulticiding	Delete
Edit	6690	6/2/2008	Mosquito Adulticiding	Delete

Calendar Maintenance

Modify Event ID: 6749

Enter a Calendar Event

Dept. - Fogging / West Nile

Title: Mosquito Adulticiding (100 char max)

Description (3000 char max):

```
Mosquito spraying for (<b>Thursday July 17th,
2008</b>) will be conducted in Arlington,
Chandler, Gila Bend, Gilbert, Mesa, Queen
Creek and unincorporated areas in Maricopa
County. <br><br>

The area in Arlington is within an area around
the water treatment plant 1 mile west of Gila
Bend Blvd south of Watermelon Rd (Map B
C050526) (Exceeds flood water mosquito
```

Start Date: 7/17/2008 (ie: 4/3/2004)

Start Time: 10:00 PM (ie: 9:00am / 4:15pm etc)

Department of Public Health and Environmental Services Department

West Nile Virus in Maricopa County

Maricopa County Departments of Public Health and Environmental Services work closely to protect residents of Maricopa County against West Nile Virus (WNV).

In our efforts, Environmental Services has the tough job of locating areas where there is a lot of mosquito activity, catching those mosquitoes and then testing them to see if they have the virus. They also respond to all complaints related to green pools, stagnant water, dead birds and of course mosquitoes. Using such tools as mosquito testing, Environmental Services is the front line in informing residents know where WNV is in the county.

Public Health works with Environmental on the human side of the virus. Working with hospitals throughout the county, Public Health does human surveillance trying to find hot spots in the Valley and monitoring any patients that come in with potential WNV symptoms.

Together both departments work to educate the public about what they can do to protect themselves and their family from contracting WNV.

Subscribe to West Nile Virus Information Updates

Today's Fogging Schedule

Mosquito Adulticide

Upcoming Fogging Schedule

- Mosquito Adulticide - 4/3/2010
- Mosquito Adulticide - 4/4/2010

more...

West Nile Virus :: News

Mosquitoes are 'in the works'-"Fight the Bite" on Labor Day! 9/4/2009
Mosquito breeding season is still in its peak. The heat and recent monsoon rains provide ideal breeding grounds for mosquitoes. It is essential to follow necessary recommendations to eliminate mosqui ....More Details

Maricopa County Confirms First Human Case of WNV in 2009 7/1/2009
The 2009 West Nile Virus season has started here in Arizona. Today, the Maricopa County Department of Public Health and Arizona Department of Health Services confirmed that a woman in her 40's is the ....More Details

Online Reporting Tools

stagnant water | green pool
mosquitos | dead bird

Finding More Information

- Environmental Services
- Additional Information & Resources
- Fogging
- AZ Department of Health Services
- Center for Disease Control
- EPA
- WNV in Chinese
- WNV in French
- WNV in Vietnamese

Department of Public Health and Environmental Services Department

<	April 2010					>
S	M	T	W	T	F	S
28	29	30	31	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	1
2	3	4	5	6	7	8

Mosquito Adulticide

Fogging / West Nile

You have reached the Maricopa County Vector Control Mosquito Fogging Informational line. Weather conditions, circumstances and time permitting, the following areas are scheduled to be fogged on Saturday April 3, 2010 during the time frame of 10 pm to 5 am Saturday evening /Sunday morning.

Mosquito spraying for Saturday April 3, 2010 will be conducted in Gilbert, Phoenix and Tempe.

The area in Gilbert is within an area from Guadalupe Rd to Elliot Rd and from Greenfield Rd to Higley Rd (p168 D010610) (Exceeds population thresholds in the area)

The first area in Phoenix within an area from Union Hills to Bell Rd and from 7th Street to 7th Ave (p84 A040332) (Exceeds population thresholds in the area)

The second area in Phoenix within an area from Loop Highway 101 to Union Hills Dr and from 7th Ave to 19th Ave (p84 A040330) (Exceeds population thresholds in the area)

The first area in Tempe is within an area from Baseline Rd to Guadalupe Rd and from Rural Rd to McClintock Dr (p166 D010402) (Exceeds population thresholds in the area)

The second area in Tempe is within an area from Baseline Rd to Guadalupe Rd and from Rural Rd to McClintock Dr (p166 D010402) (Exceeds population thresholds in the area)

Your call is appreciated.

Date: 4/3/2010

Time: 10:00 PM - 5:00 AM

Online Reporting Tools
stagnant water | green pool
mosquitos | dead bird

Finding More Information
Environmental Services
Additional Information & Resources
Fogging
AZ Department of Health Services
Center for Disease Control
EPA
WNV in Chinese
WNV in French
WNV in Vietnamese

Mosquito Activity in your neighborhood
Fogging | Trapping

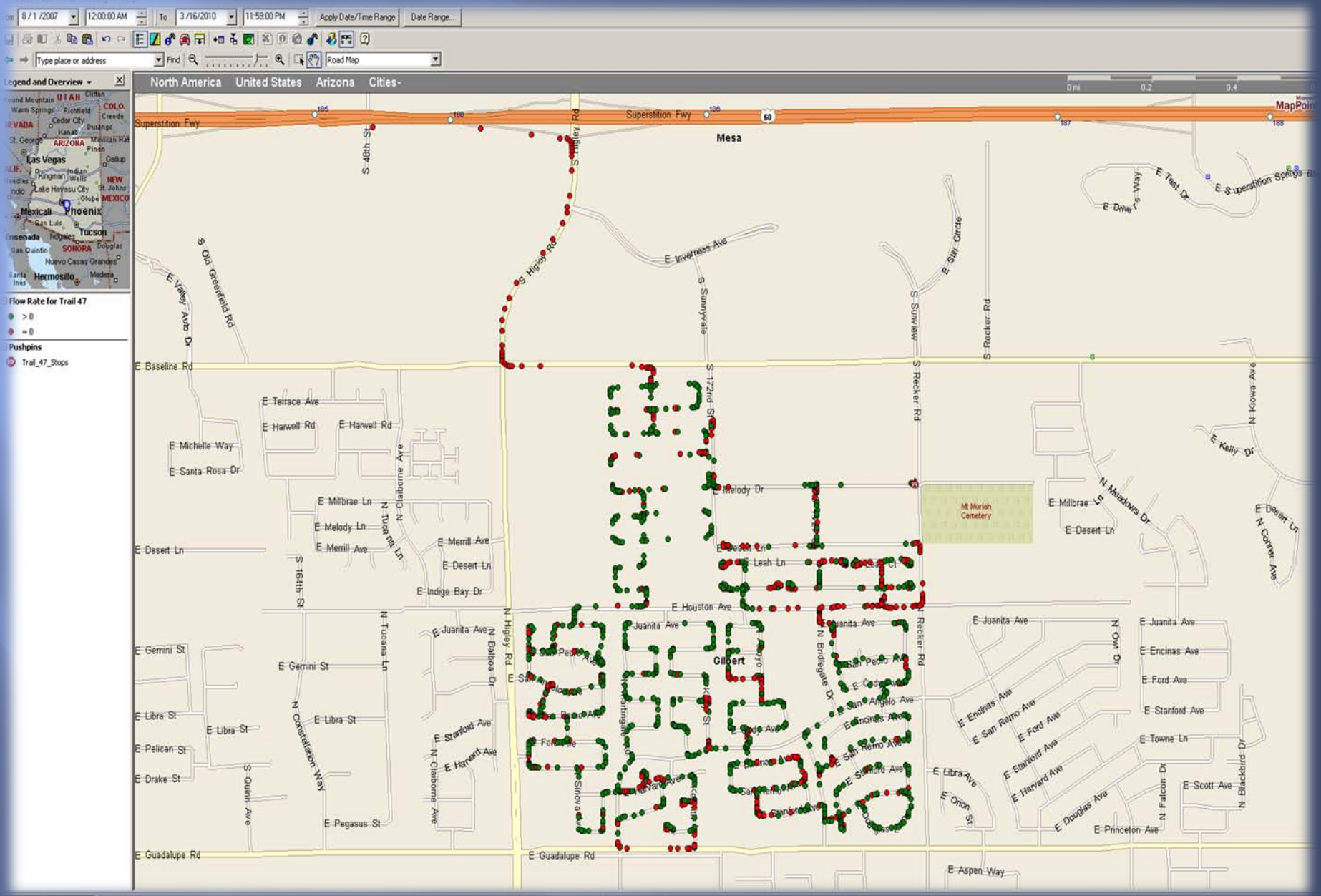
Equipment Used in Adulticide

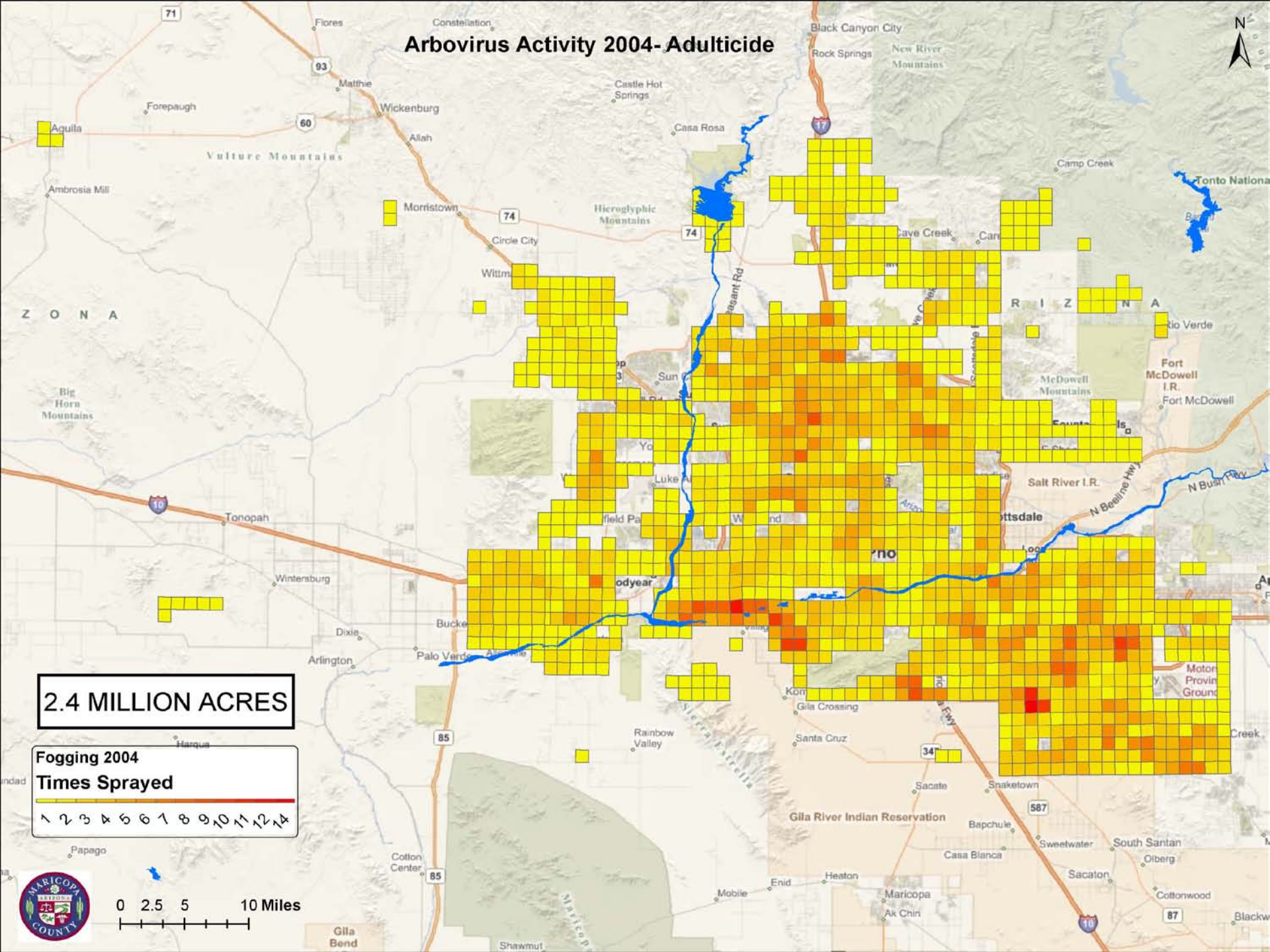
Fogging Truck

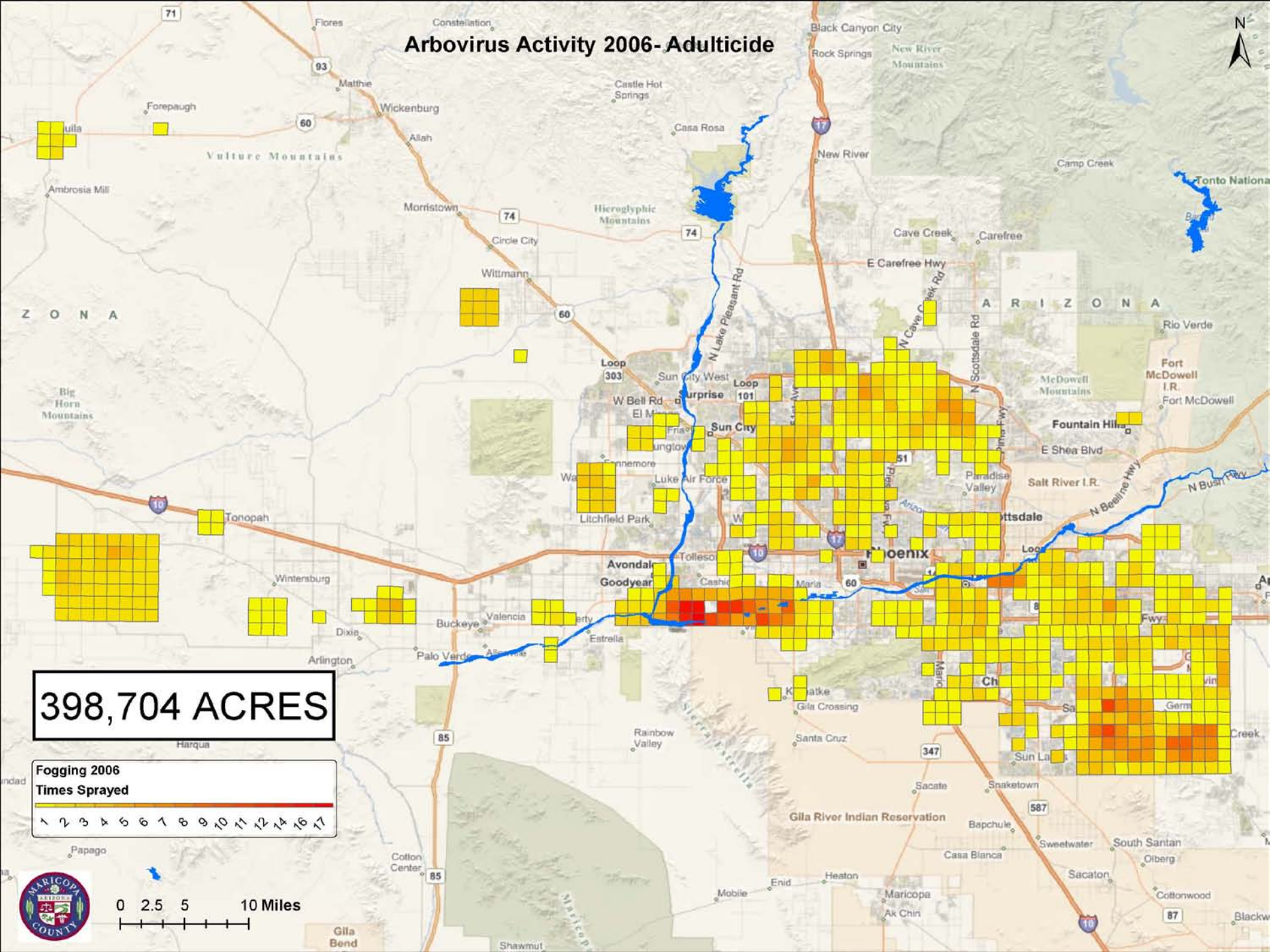
Radar Gun

Fogger Pump

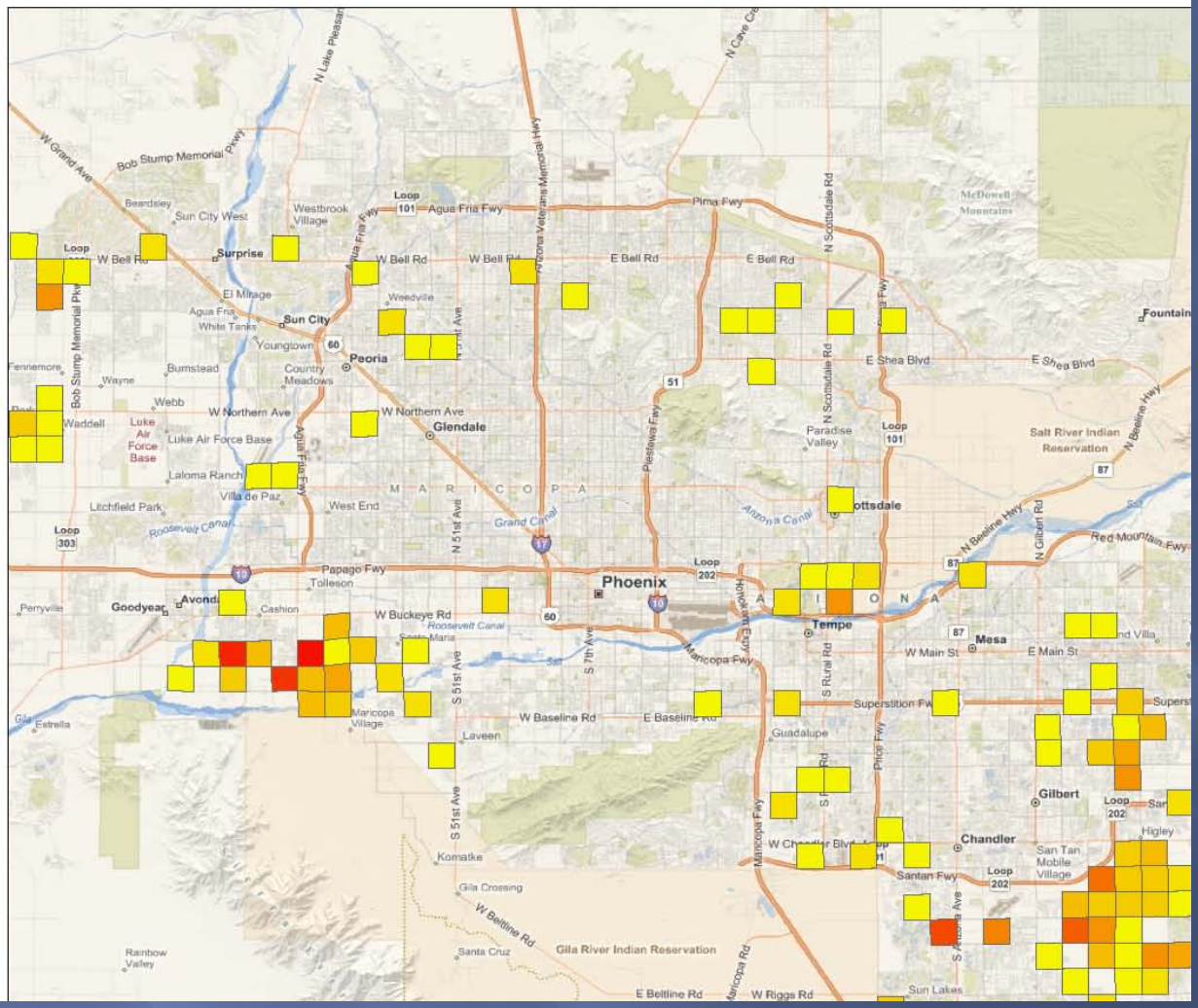
Fogger Pump On/Off (DataMaster II)




Arbovirus Activity 2004- Adulticide
2.4 MILLION ACRES
Fogging 2004
Times Sprayed
1 2 3 4 5 6 7 8 9 10 11 12 14
0 2.5 5 10 Miles
N
Black Canyon City
Rock Springs
New River Mountains
Castle Hot Springs
Casa Rosa
Flores
Constellation
Matthie
Wickenburg
Forepaugh
Aguila
Allah
Vulture Mountains
Ambrosia Mill
Morristown
Hieroglyphic Mountains
Circle City
Camp Creek
Tonto National
Cave Creek
Rio Verde
Fort McDowell I.R.
Fort McDowell
McDowell Mountains
Salt River I.R.
N Beeline Hwy
N Bush Hwy
Big Horn Mountains
Tonopah
Wintersburg
Dixie
Arlington
Palo Verde
Gila Crossing
Santa Cruz
Rainbow Valley
Sierra Estrella
Sacate
Snaketown
Gila River Indian Reservation
Bapchule
Sweetwater
South Santan
Olberg
Casa Blanca
Sacaton
Cottonwood
Heaton
Enid
Mobile
Maricopa
Ak Chin
Cotton Center
Papago
Harqua
Gila Bend
Shawmut
Motor Provin Ground
Creek
Z O N A
R I Z O N A
71
93
60
74
17
10
85
34
587
87


Arbovirus Activity 2006- Adulticide
398,704 ACRES
Fogging 2006
Times Sprayed
1 2 3 4 5 6 7 8 9 10 11 12 14 16 17
0 2.5 5 10 Miles
N
Black Canyon City
Rock Springs
New River Mountains
Castle Hot Springs
Casa Rosa
New River
Camp Creek
Tonto National
Cave Creek
Carefree
E Carefree Hwy
Hieroglyphic Mountains
Morristown
Circle City
Wittmann
Vulture Mountains
Ambrosia Mill
Forepaugh
Wickenburg
Allah
Matthie
Flores
Constellation
Z O N A
A R I Z O N A
Rio Verde
Fort McDowell I.R.
Fort McDowell
McDowell Mountains
Fountain Hills
E Shea Blvd
Salt River I.R.
Paradise Valley
N Beeline Hwy
N Bush Hwy
N Lake Pleasant Rd
N Scottsdale Rd
Loop 303
Loop 101
Sun City West
Surprise
W Bell Rd
Sun City
Luke Air Force
Litchfield Park
Tonopah
Wintersburg
Avondale
Goodyear
Tolleson
Maria
Buckeye
Valencia
Estrella
Dixie
Arlington
Palo Verde
Gila Crossing
Santa Cruz
Rainbow Valley
Sierra Estrella
Harqua
Papago
Cotton Center
Gila Bend
Shawmut
Mobile
Enid
Heaton
Maricopa
Ak Chin
Sacate
Snaketown
Gila River Indian Reservation
Bapchule
Sweetwater
South Santan
Olberg
Casa Blanca
Sacaton
Cottonwood
Blackw
Sun La
Germ
Creek
Maricopa County

Adulticide Map 2009



Conclusion: Benefits of GIS

- Increases adulticide application efficiency
- Reduces required reporting time
- Increases field-work control
- Improves customer service
- Provides a better organized surveillance
- Reduces costs
- Provides real-time mapping of adulticide areas through the use of DataMaster

Resources

- http://www.maricopa.gov/Public_Health/HotTopics/wnv/
- http://www.maricopa.gov/EnvSvc/VectorControl/
- http://www.cdc.gov/ncidod/dvbid/westnile/
- http://www.cmmcp.org/adulticide.htm

QUESTIONS?