



Mosquito Control Activities and Response to Dengue Key West, FL

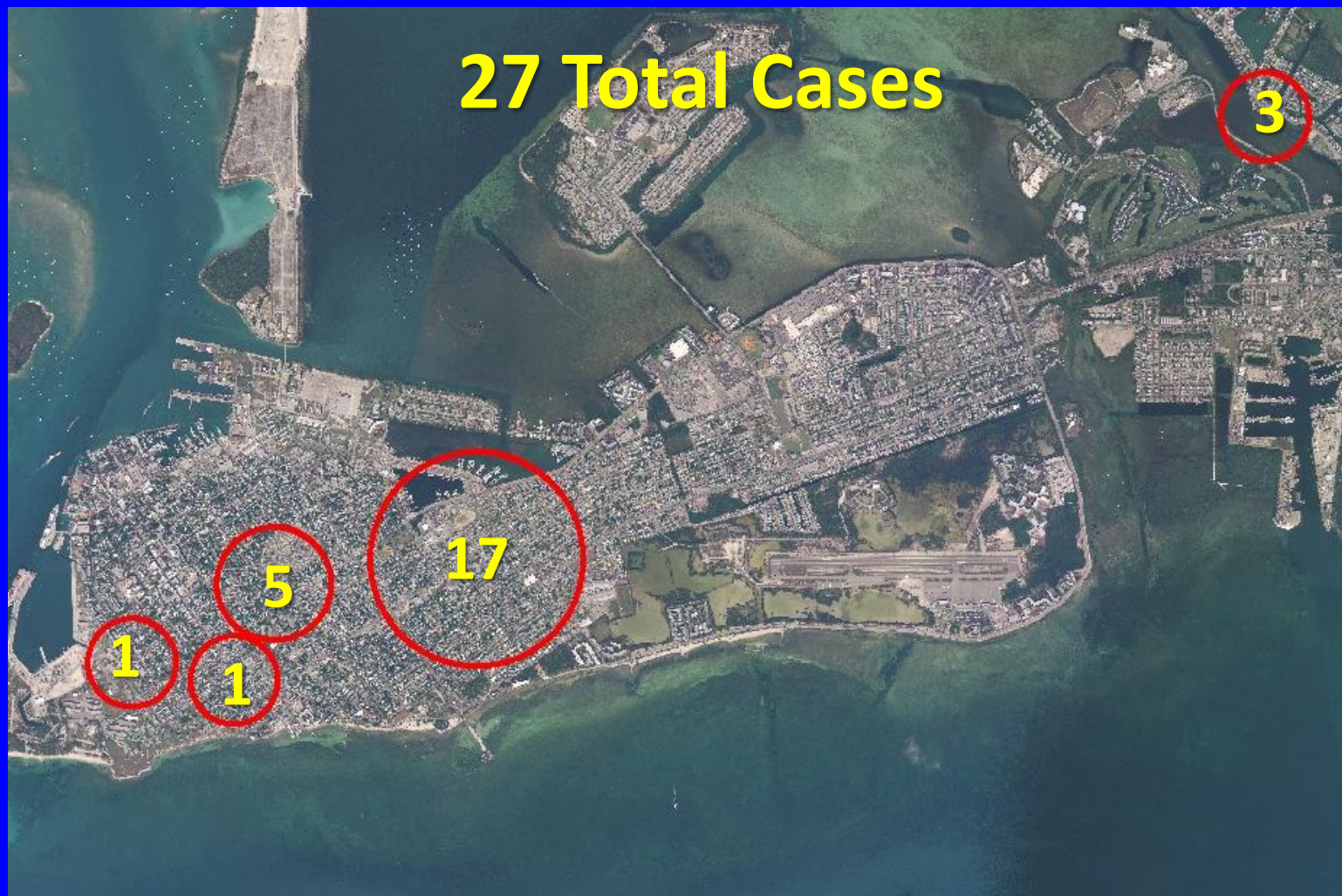
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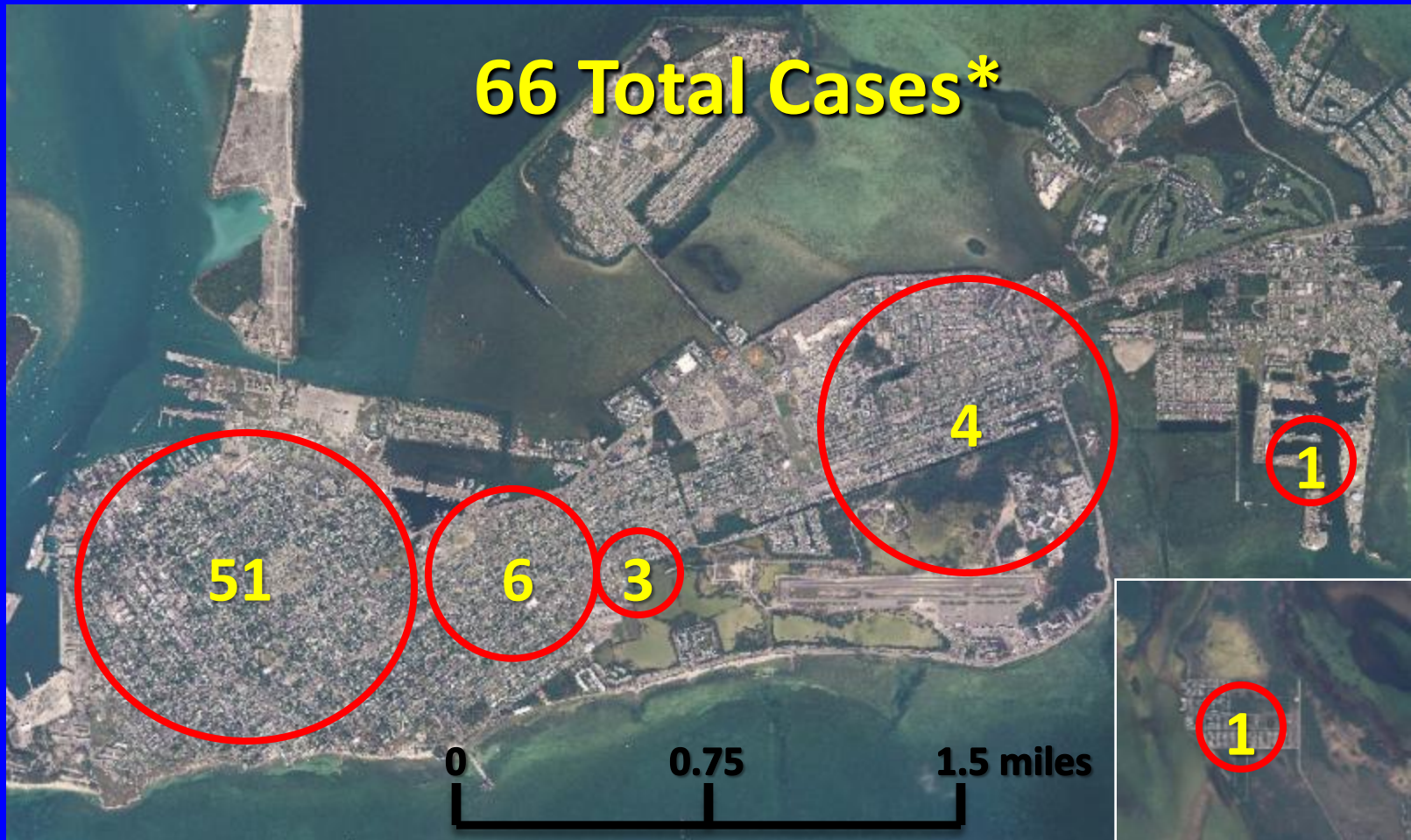
Florida Keys Mosquito Control District

March 2011

Dengue in Key West: 2009



Dengue in Key West: 2010-2011



Domestic Inspections

Sample of one day/one neighborhood in Key West



- No mosquitoes found
- Mosquitoes found

Aedes aegypti

- The “Yellow Fever mosquito”
- Disease vector
 - Dengue
 - Yellow Fever
 - Chikungunya



Aedes aegypti

- Most common container breeding mosquito
 - Birdbaths
 - Trash cans
 - 5-Gallon Buckets
 - Tires
 - Bromeliads
- Active day biters
- Prefers humans



Domestic Program

- Key West
 - 11 Inspectors
 - 7 Residential
 - 3 Drain
 - 1 Residential/Drain
- Rest of Keys
 - 12 Inspectors





Domestic Program

- **Drier Months Response:**
 - Inspectors Visit Every Property at Least Once a Month
 - Respond to Service Requests
- **Rainy Season Response:**
 - Work off a “Hotspot” list
 - Respond to Service Requests
 - Respond to Dengue Case Locations
 - Visit High Trap Count locations





Adult Trapping

50 BG Traps in Key West including Stock Island
60 traps throughout the rest of the Keys

Fay Prince Bi-directional Trap



BG Sentinel Trap



CDC Light Trap



Adult Mosquito Control

- Handheld foggers
- Truck-mounted fogging
- Aerial aduaticiding



Public Education

- Door Knockers
- Newspaper Articles
- Speaking engagements
- Radio Spots



Dengue

The key to avoiding infection is prevention!

Symptoms

- High fever
- Severe headache
- Intense pain behind the eyes
- Muscle, joint and bone pain
- Rash
- Itching

Prevention

- The best prevention measure is to eliminate the areas where mosquitoes lay their eggs. Mosquitoes breed in standing water.
- Use repellents.
- Wear long pants and sleeves when going swimming.
- Empty, cover, or discard standing water in your yard.

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION
www.cdc.gov/dengue

MONROE COUNTY HEALTH DEPARTMENT
(305) 809-5653

FLORIDA Mosquito Control DISTRICT KEYS
(305) 292-7190

Dengue is ...

- A virus that can be caught from the bite of a particular species of mosquito found in tropical and subtropical areas.
- A disease that brings very high fever, bone-crushing aches and pains, severe headache, eye pain and mild rash. If you encounter any of these symptoms, please see a physician.
- Something that you can protect yourself against: Fight the bite from mosquitoes with clothing that covers your skin, mosquito repellents containing DEET and routine checks for tears or holes in screens on doors and windows.
- One of the most important prevention measures that you can take is to walk your property daily, dumping any water that has collected in containers made of manmade material where mosquitoes can breed.

MONROE COUNTY HEALTH DEPARTMENT

Public Information
(305) 809-5653

FLORIDA KEYS MOSQUITO CONTROL DISTRICT INSPECTION REPORT

YOU PASSED!

Personnel from the Florida Keys Mosquito Control District visited your premises today to search for the dengue vector, *Aedes aegypti*. No infested containers were found. Congratulations on doing your part to control the spread of dengue fever in the Florida Keys. Keep up the good work. Together we can beat dengue.

OH NO!

Personnel from the Florida Keys Mosquito Control District visited your premises today to search for the dengue vector, *Aedes aegypti*. Unfortunately infested containers or adult mosquitoes were found.

Please see the yellow door hanger for more information regarding what mosquitoes were found and where they were found.

Controlling the spread of dengue requires that you do your part to stop the breeding of mosquitoes in the Florida Keys. The biggest step you can take to help is to maintain a mosquito-free premises. This includes emptying containers that can hold water and reporting adult mosquitoes to the mosquito control office.

Personnel from the Florida Keys Mosquito Control District will visit again to check on your progress. Please do your part to control the spread of dengue fever in the Florida Keys. Together we can beat dengue.

Your residence and surrounding area were inspected for mosquito breeding on: _____

Our inspection revealed:

Mosquito breeding was found on your property at the following sites: _____

We were unable to inspect your premises due to _____

Please call one of the numbers listed below to arrange for an appointment.

For assistance, please call one of the numbers listed below.
KEYS: Lower, 252-7190; Middle, 289-3705; Upper, 453-1290.
Or call our toll free number at 1-800-276-7493.

FLORIDA Mosquito Control DISTRICT KEYS Inspector _____

- Homeowner's Guide DVD
- Goal: Speak to as many residents as possible



New Studies/Technologies

Adult Control

- Trap N Kill Study
 - July 2010-August 2010 Larval Control
- Aerial liquid larviciding Key West via Helicopter
- Sterile Male Release



Adult Control

- Trap N Kill



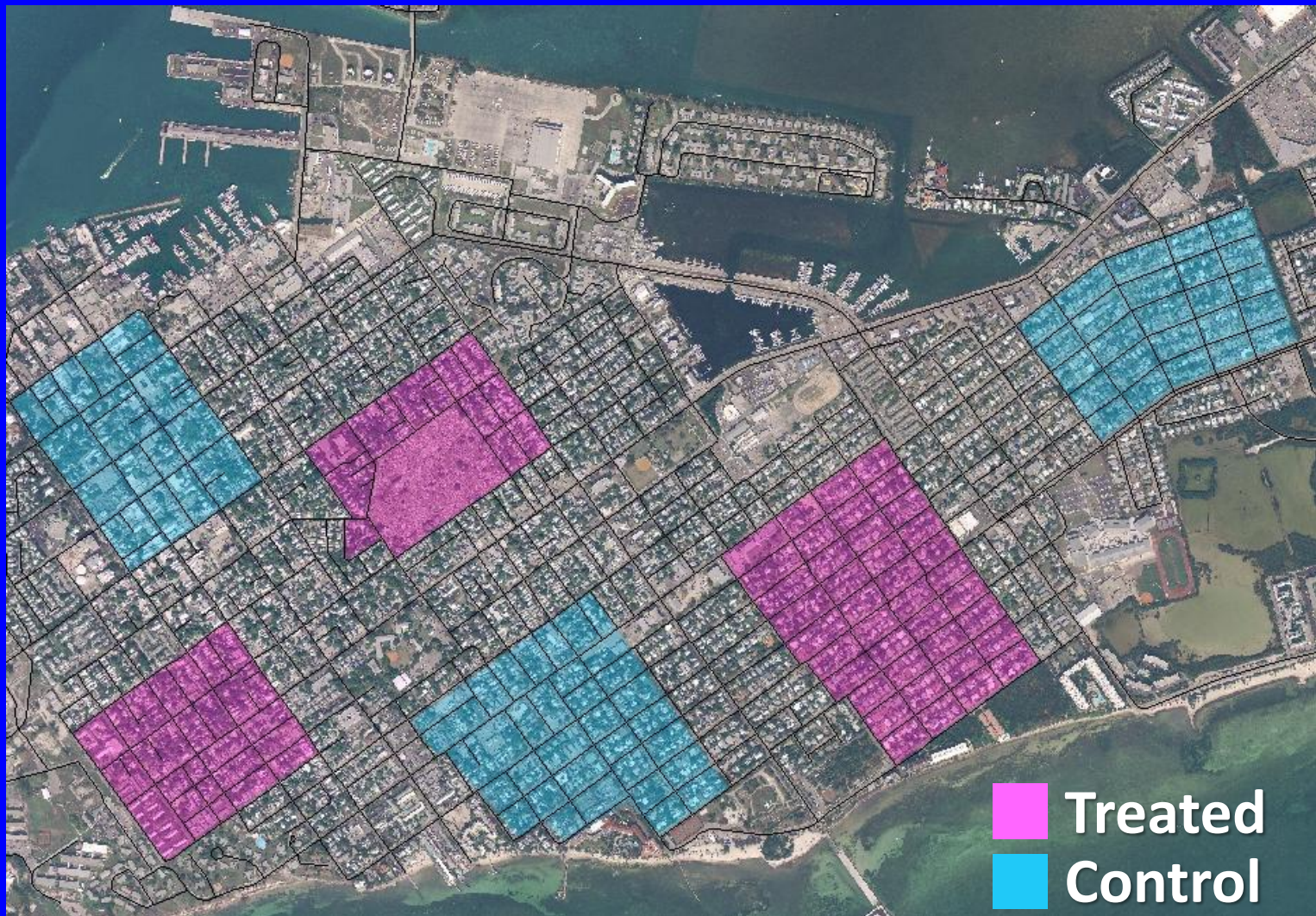
Bifenthrin

Trap N Kill Study

- Over 5,300 traps deployed in July 2010
- 3 treated areas, 3 control areas
 - Check for larvae/pupae every 2 weeks
 - Once a month, change insecticide strip



Area of Trap N Kill Study



Larval Control with Liquid BTI via Helicopter

- Liquid BTI: mosquito specific
 - Better coverage
 - Lots of areas that inspectors cannot access
 - Vacant properties
 - Gutters

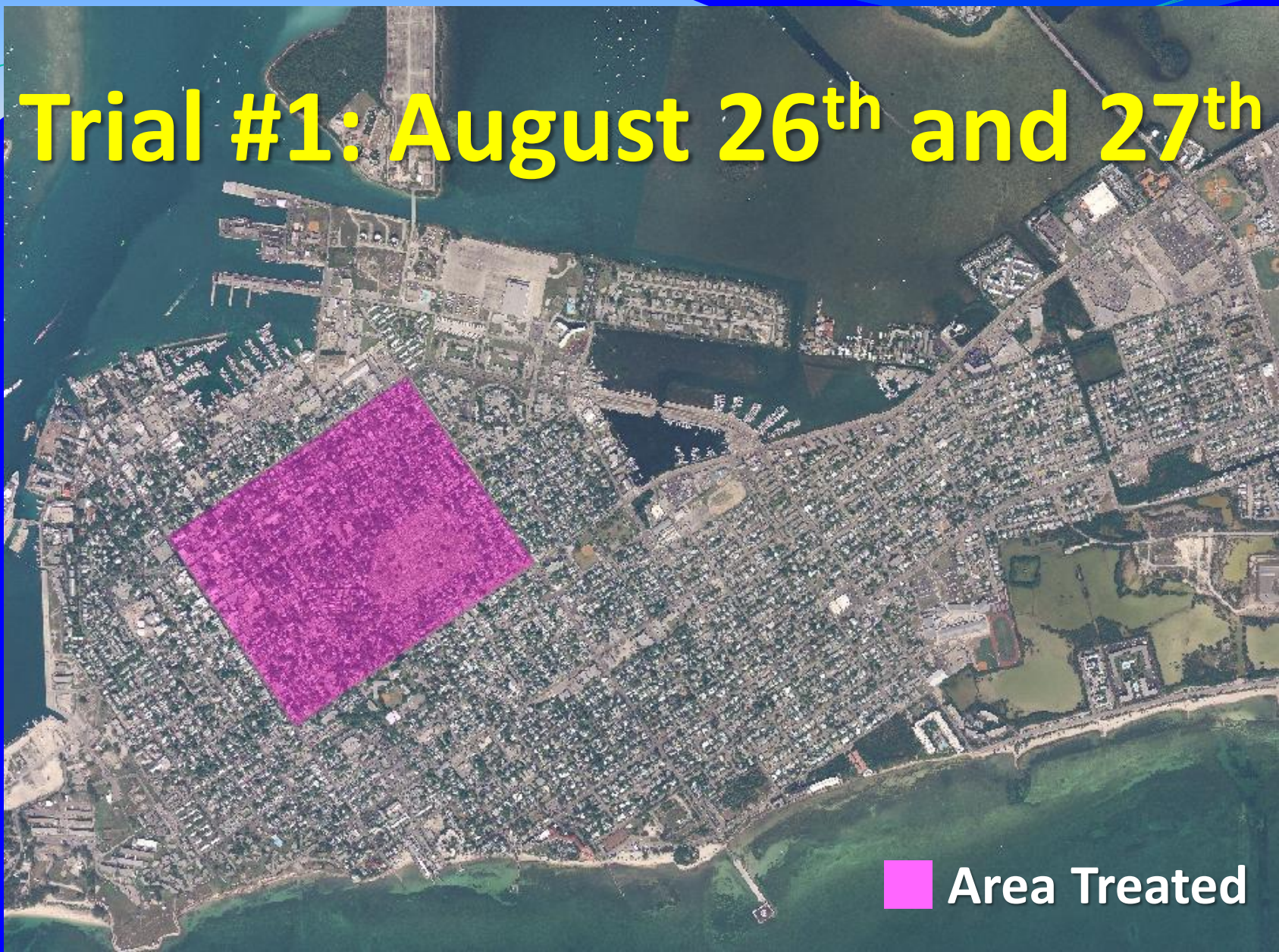


Aerial Applications

- Several Trials with the new product
 - Placed cups in variety of areas with larvae
 - Check area pre and post spray
 - Saw good larval mortality after 24hrs



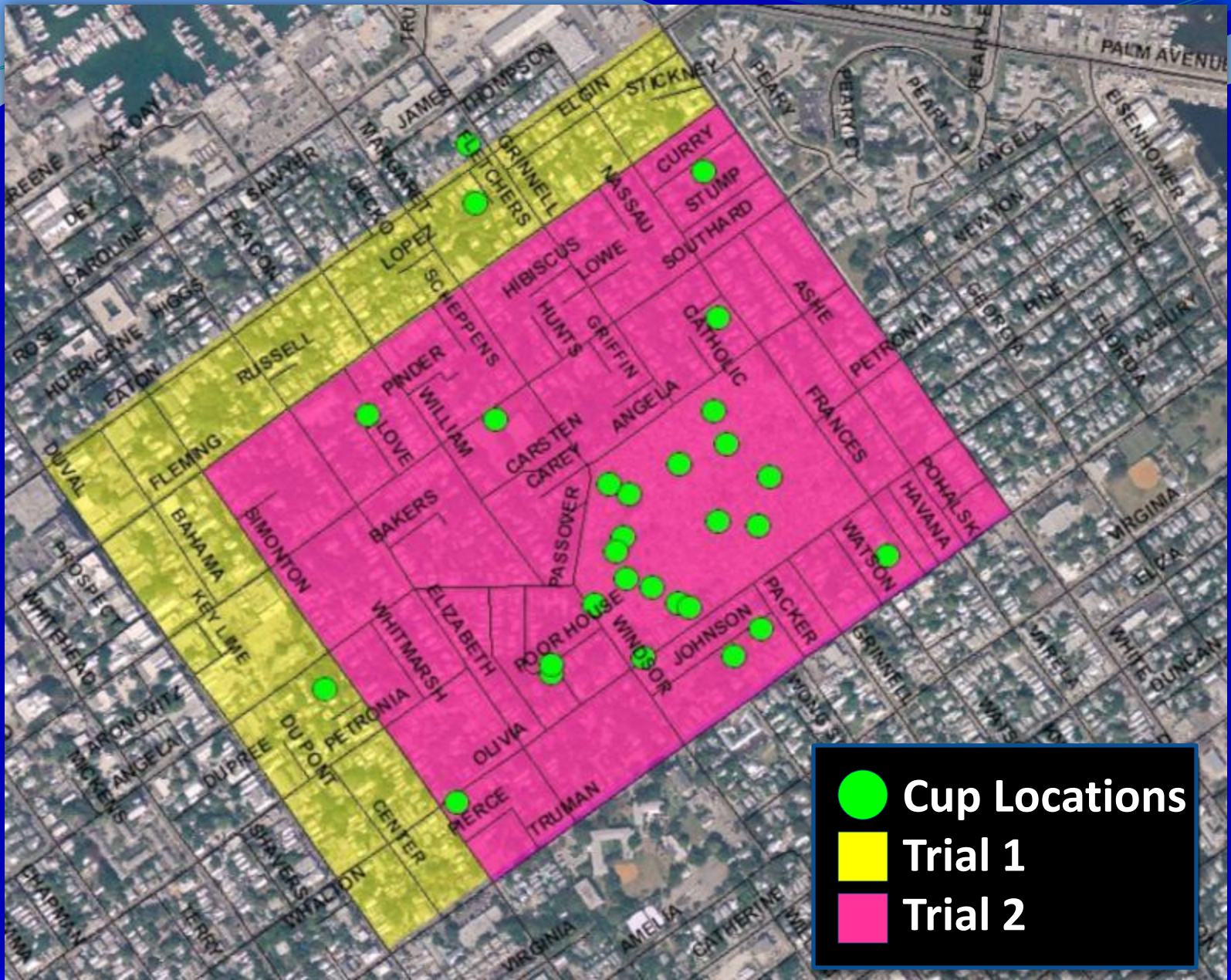
Trial #1: August 26th and 27th



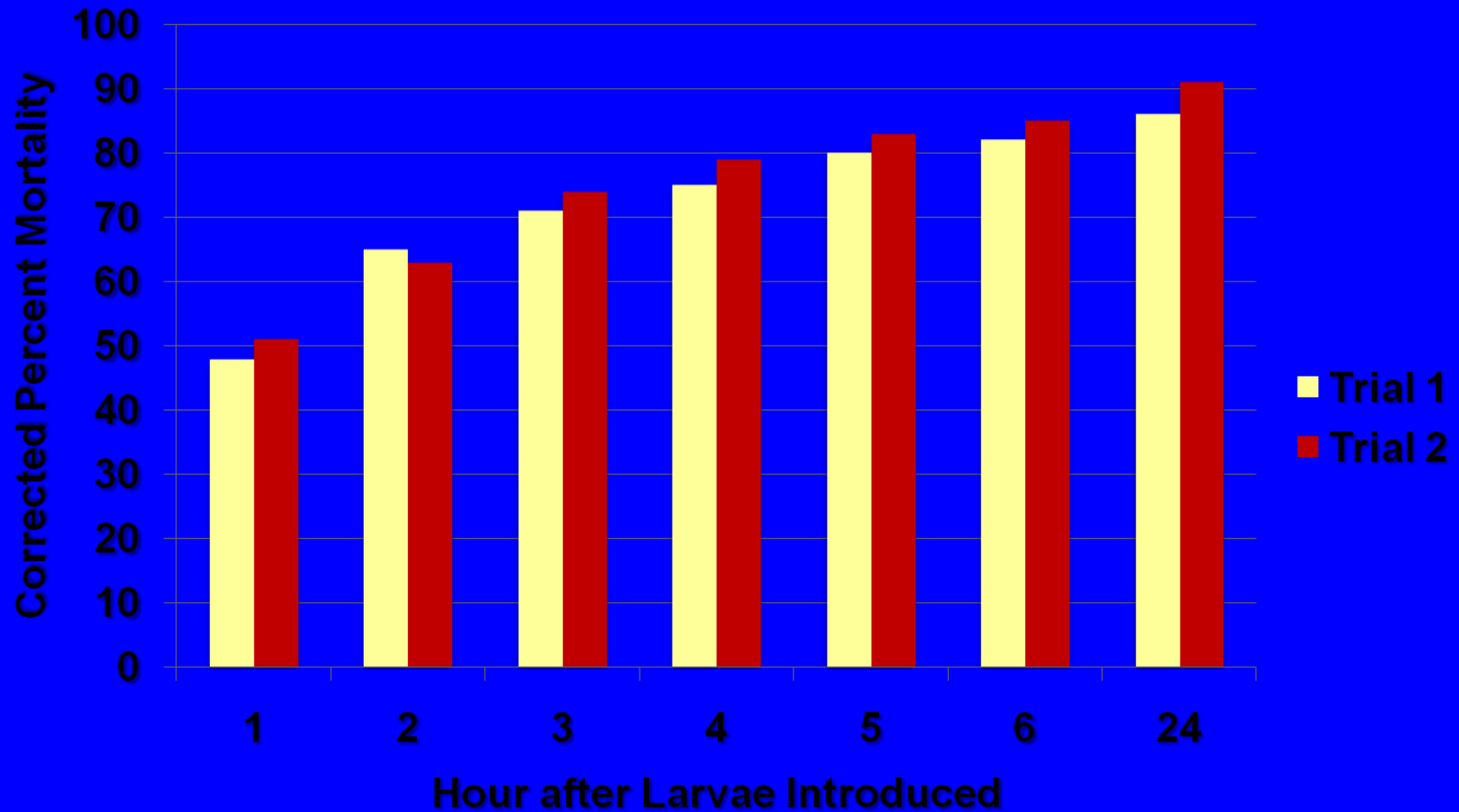
Area Treated

Trial #2: Sept. 18th and Sept. 25th

 Area Treated



Corrected % Larval Mortality



Purchased Equipment for Operations

- Isolair spray system
- Micronair spray heads (AU 5000=Atomizers)



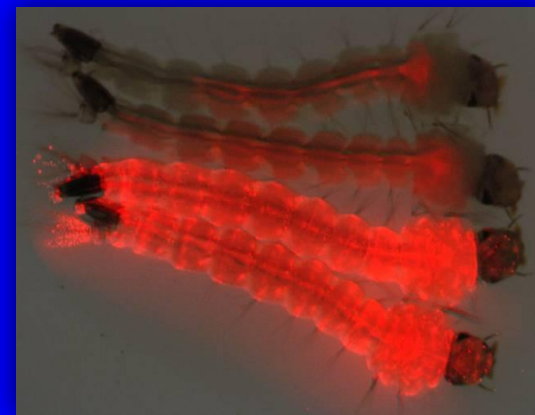
Purchased Equipment for Operations

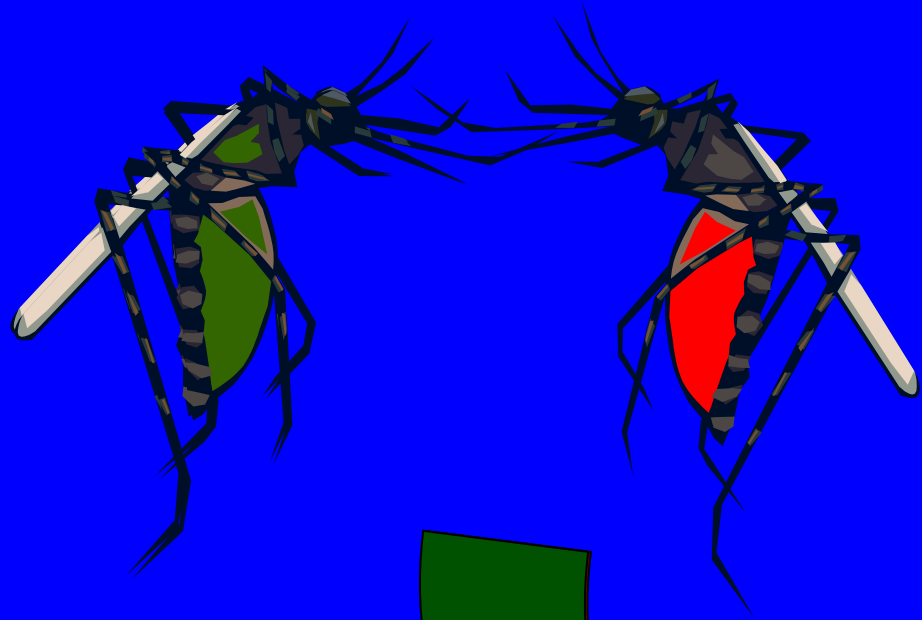
- Mix truck set up



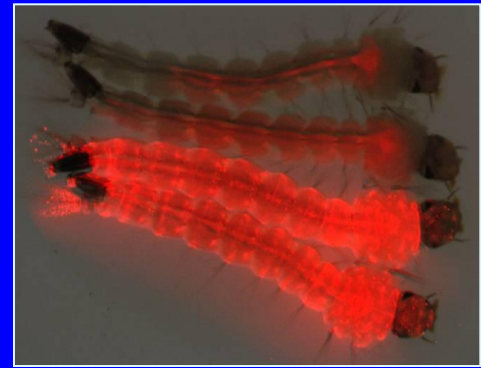
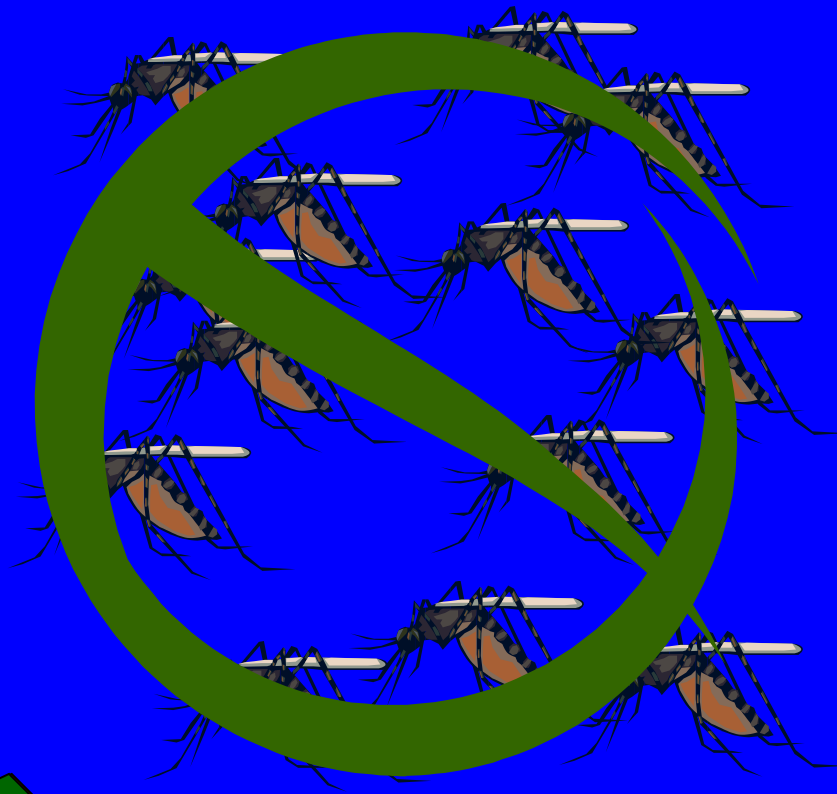
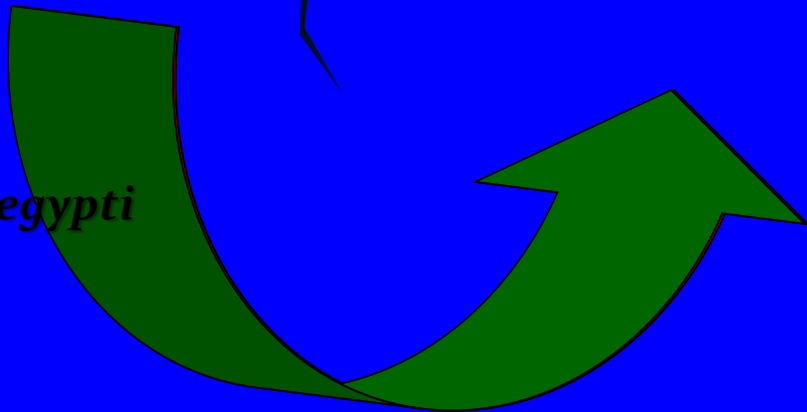
Sterile Male Release in Key West

- Sterile Male Releases-Working with OXITEC from Oxford, England
- RIDL technology
- Genetically modified *Aedes aegypti*





RIDL®
Male *Aedes aegypti*



Oxitec's Approach

- Male mosquitoes do not bite or spread disease
- Will release hundreds of thousands of these mosquitoes a week for 6 months
- Sterile males using genetics-fed tetracycline
- Mate with wild females and all offspring die
- Males are more effective than humans at finding females-males mate once and die 5 days later
- Reduce population to point of no disease transmission



Benefits of Oxitec's approach

- reduction in mosquito population below the level required to transmit disease
- long term control solution
- species specific
- self limiting strategy, controllable
- cost effective
- sustainable
 - APHIS (USDA) determined approach is not merely acceptable but is **environmentally preferable to all available alternatives.**



Any object that holds water is an ideal breeding site. Finding and treating all of these with insecticides is an impossible task.



'Fogging' with insecticides is a temporary control measure.

Other Similar Studies...

- **Cayman Island Study**
 - **Completed November 2010**
 - **Saw 80% reduction the *Aedes aegypti* pop. in release area with no other Mosquito Control**
- **Malaysia**
- **Brazil**

Combination of Control Methods

Use an IMM strategy for breeding site reduction to reduce the population, and then using RIDL to reduce to zero or near zero. Sustained, low level release then maintains the population at that level.

SIT/RIDL SIT

Control/time

Field Site

Treatment
Area

Control Area



Field Site



Study Timeline

- **Permitting Process-Application has been submitted to USDA APHIS Vet Services**
 - **Environmental assessment: January**
 - **Interagency Review (EPA, CDC) and then legal review**
 - **Public Comment: April**
 - **Permission: July**
- **Community Engagement**
 - **April**

Conclusions

- Continue door to door inspections
- Continue Aerial-liquid larviciding via helicopter
- Increase adult trapping effort
- Continue homeowner education process, school education and community outreach booths
- Continue working closely with the Health Dept to gain community support and action with their ABCD Program
- Continue the process to release a “genetically modified male sterile mosquito” in Key West

Lower the *Aedes aegypti* population





Questions?

