

*Sustainable Maryland Wednesday Webinars*

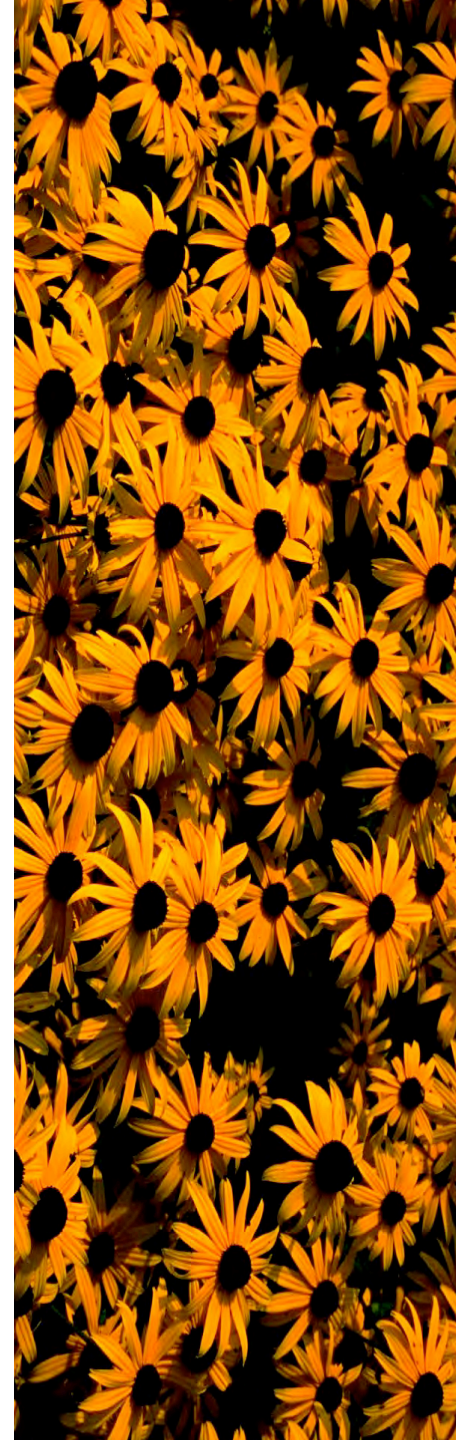
# Developing a Community-Based Mosquito Control Program

David Brosch, Arlene Christiansen

February 15, 2017



ENVIRONMENTAL  
FINANCE CENTER



# Sustainable Maryland

- Free & Voluntary program for communities that want to go green and save green!
- We help communities
  - choose a direction for their sustainability efforts
  - Improve access to resources
  - Measure their progress
  - Share success with other communities



## Actions for Sustainable Communities:

To become Sustainable Maryland Certified, municipalities must complete and document actions from the list below. To achieve certification, municipalities will need to complete actions worth a total of 150 points, including two Mandatory Actions (M) and two of six Priority Actions (P), and submit the appropriate documents as evidence that the requirements have been satisfied.

ACTION ITEM	POINTS
<b>COMMUNITY ACTION</b>	
<b>Green Team</b>	
Participate in SMC Green Team Training	5
Create a Green Team	10 M
Complete a Green Team Action Plan	10 M
Conduct Community Barriers and Benefits Assessment	15
Build SMC Resource Center	5
Participation in MD Green Schools	10
Innovative Demonstration Projects	5 to 20
<b>COMMUNITY-BASED FOOD SYSTEM</b>	
<b>Local Food Consumption</b>	
Local Food Fair	10
Local Food Consumption & Preservation Classes	5 per class
Establish Local Farmers Market	15
Promote Local Farmers Market	5
<b>Local Food Production</b>	
Community Gardens	15 P
Spring Transplant Sale	10
Fall Transplant Sale	10
Establish CSA Drop-off Location	10
Innovative Demonstration Projects	5 to 20
<b>ENERGY</b>	
Municipal Energy Audits	10 (1st bldg), 5 (consec bldgs) P
Residential Energy Efficiency	5 to 20+
Wind Energy Project	10
Innovative Demonstration Projects	5 to 20
<b>GREENHOUSE GAS</b>	
Municipal Carbon Footprint (pre-requisite)	15 P
Community Carbon Footprint (pre-requisite)	15
<b>Climate Planning</b>	
Climate Action Plan	10 to 25+
Climate Change	5
Innovative Demonstration Projects	5 to 20
<b>HEALTH &amp; WELLNESS</b>	
Let's Move!	15
<b>Workplace Wellness</b>	
Join Maryland Green Business	5
Workplace Wellness Program	5 to 15
Living Wage Program	5 per class
Innovative Demonstration Projects	5 to 20
<b>LOCAL ECONOMIES</b>	
<b>Buy Local</b>	
Establish Local Business Roundtable	10
Promote Local Buy	5
Buy Local Campaign	15
Local Business Roundtable	10
Local Business Procurement Notices	15
Economic Analysis of Procurement Practices	15
Local Purchasing Preference Policy	15
<b>Green Business Recognition</b>	
Join Maryland Green Registry	5
Promote Maryland Green Registry	5 points per 2 businesses

Please note: Sustainable Maryland Certified actions and points may be subject to change. Printed on 50% recycled & 30% post-consumer waste paper.

ACTION ITEM	POINTS
<b>LOCAL ECONOMIES (CONTINUED)</b>	
Green Business Certification Program	15
<b>Green Purchasing</b>	
Green Purchasing Policy (pre-requisite)	15 P
Evaluate Current Purchasing Practices (pre-requisite)	10
Vendor Preference Statement (pre-requisite)	10
Purchase Recycled Products	10
Purchase Environmentally Preferable Products	10
Implement Waste Reduction Program	10
Innovative Demonstration Projects	5 to 20
<b>NATURAL RESOURCES</b>	
<b>Watershed Stewardship</b>	
Implement Watershed Stewardship/Pollution Prevention Outreach Programs	10
Facilitate Engagement in Existing Watershed Stewardship Opportunities	5 per event
Provide Voluntary Opportunities for Citizen Engagement in Watershed Stewardship	10
Provide Incentives for Watershed Stewardship on Private Lands	15
Create a Watershed Plan	20 P
<b>Stormwater Management</b>	
Stormwater Management Program	15 P
Stormwater Manager/Coordinator	15
Stormwater Fee Structure	20
<b>Septic Management</b>	
Septics System Assessment and Inventory	15
Septics System Management Plan	20
Dedicated Septic System Fund	20
<b>Water Conservation</b>	
Develop a Water Conservation Plan	15
Develop a Water Conservation Outreach Program	10
<b>Tree City USA</b>	15
<b>Pet Waste</b>	
Implement a Pet Waste Education Program	5
Develop a Pet Waste Program	5
Adopt a Pet Waste Ordinance	5
Innovative Demonstration Projects	5 to 20
<b>PLANNING AND LAND USE</b>	
Participation in DHCD Sustainable Communities Housing and the Comprehensive Plan	20
Housing and the Comprehensive Plan	10
<b>Land Preservation</b>	
Conduct Easement Outreach that Encourages Inspection, Evaluation, and Stewardship	15
Build Easement Inventory	10
Innovative Demonstration Projects	5 to 20

P denotes Priority Action M denotes Mandatory Action

To learn more visit  
[www.sustainablemaryland.com](http://www.sustainablemaryland.com)



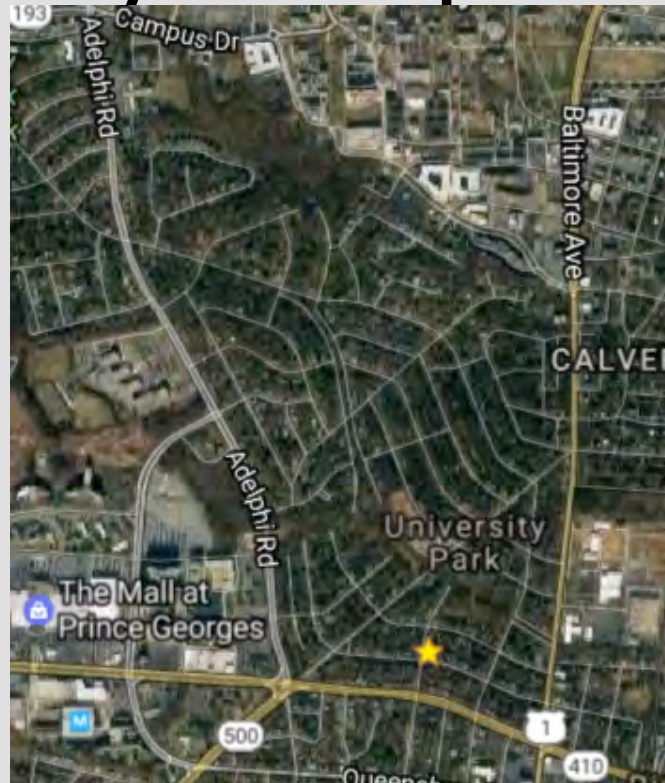
Environmental Finance Center  
[www.efc.umd.edu](http://www.efc.umd.edu)



June 2015



# Community Mosquito Control



An Experiment in  
Community Based Mosquito Control  
University Park, Maryland

# We used to enjoy our yards



# Mosquitoes were “manageable”.

- Window screens worked.
- Day-biting mosquitoes were not a problem.
- No significant danger of diseases transmitted by mosquitoes.
- Repellants were not a constant need.

NOW...

# Mosquitoes in our yards are a threat.

- There are a lot of them.
- They bite at all times (even getting into our cars).
- They may transmit West Nile virus.
- They pose danger of Dengue and Zika transmission.

## As a Result:

- Kids don't play outside.
- Pregnant women are afraid to go outside.
- Garden parties are a risk.
- Gardening is "itchy business".



# Many communities are facing the same problem

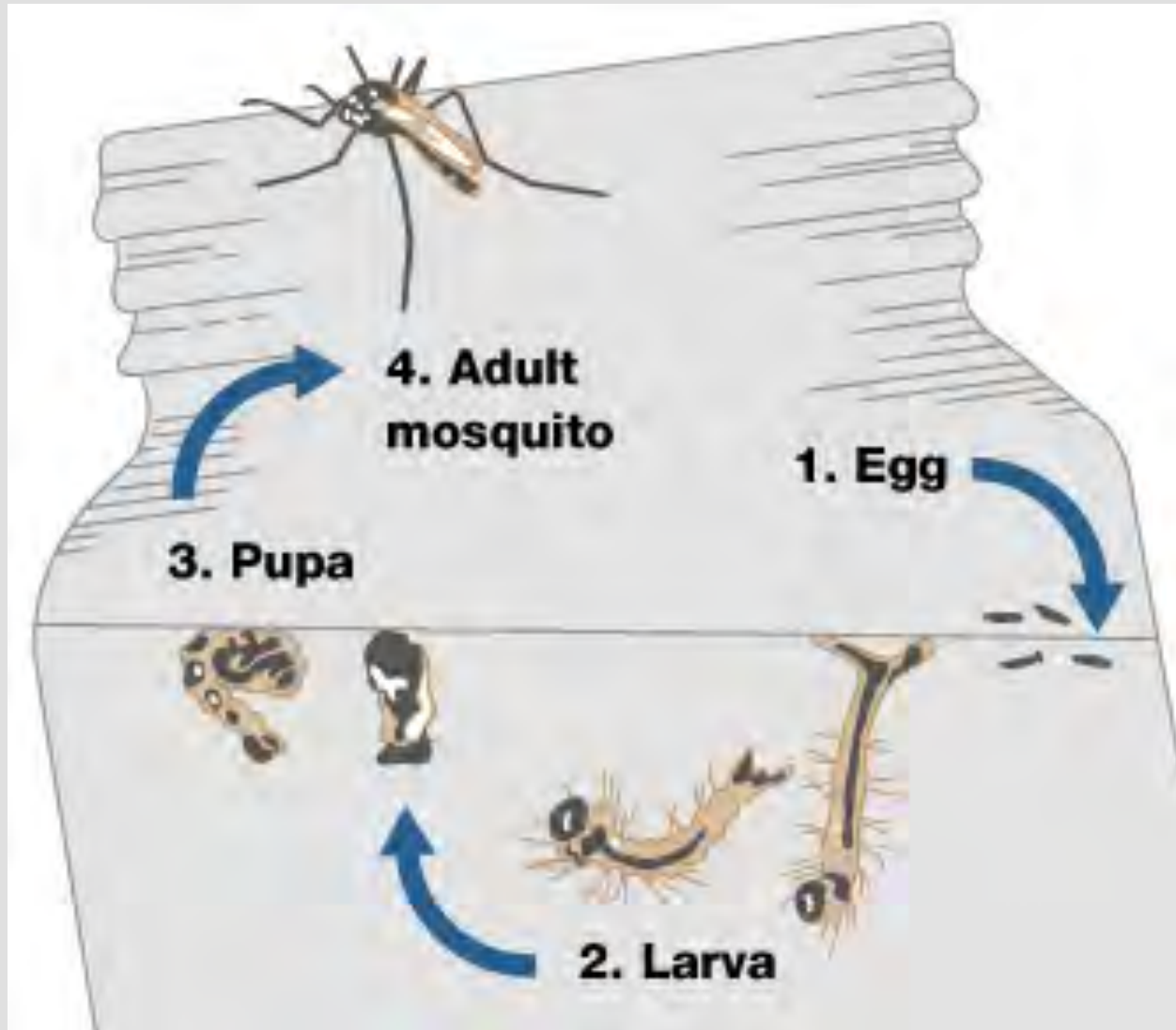


*Ae. aegypti* *Ae. albopictus*



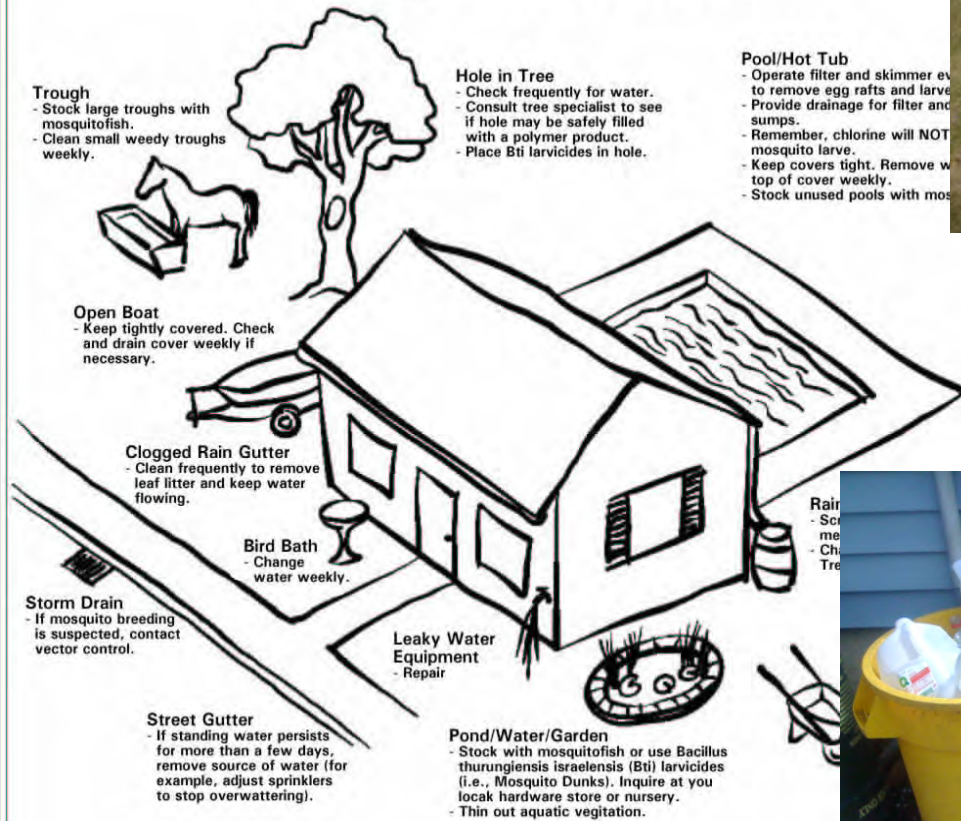
Current distribution in the US of invasive *Aedes* mosquitoes (day biters)

# Invasive *Aedes* mosquito life-cycle



# Standard response to control state and federal agen

## Target the source.



Protect yourself and your family

# Invasive mosquitoes develop exclusively in our yards. How do we control them?

Insecticide applications are not effective/wanted.

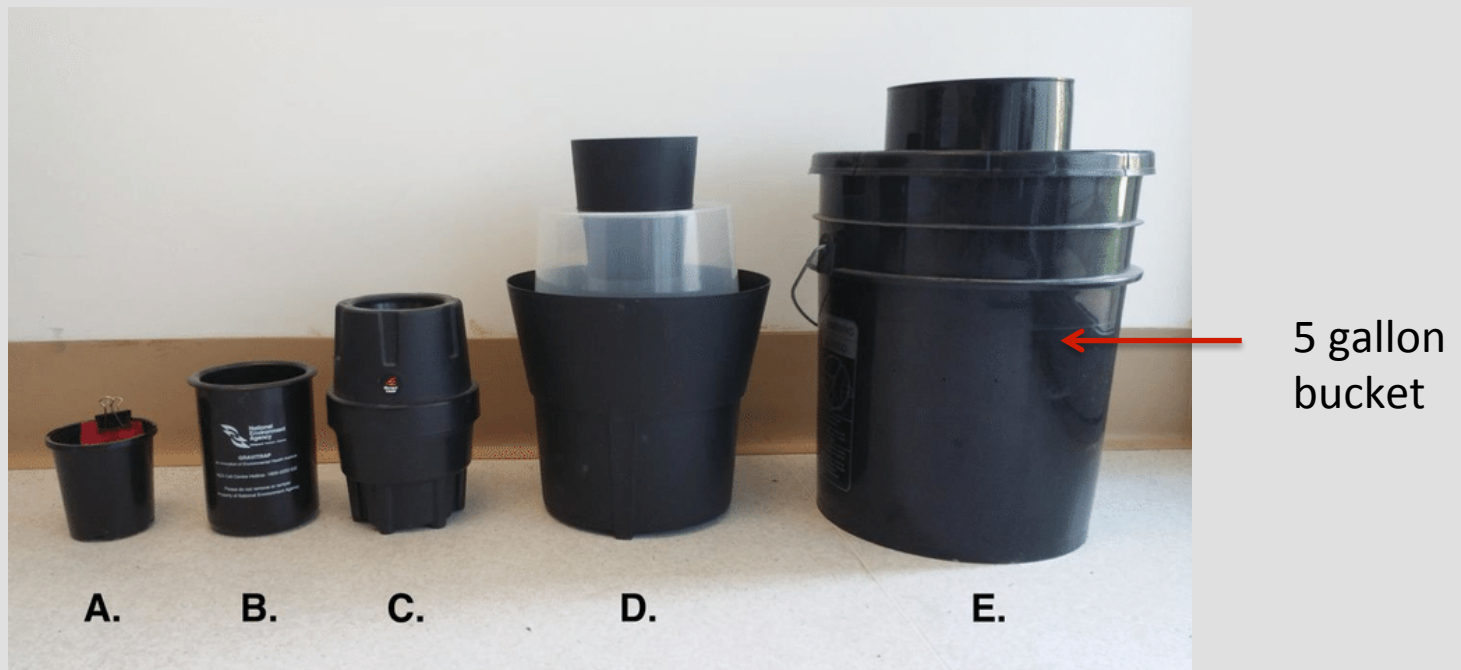
- Hard to reach backyards
- Danger to non-target species (honey-bees)
- Resident resistance to spraying of pesticides

**Most significantly,**

- Mosquitoes are becoming resistant to the insecticides.

# Lethal Ovitraps as a Control Strategy

- Have been shown to work – Puerto Rico (CDC)
- But need to be deployed in over 80% of yards in each community



# Gravid *Aedes* Traps GATs

Mosquito entry



Water attracts female mosquito  
needing to lay eggs

Transparent dome  
sitting above the  
water is lined with  
canola oil. There is  
netting across the  
bottom of the dome.  
Mosquito gets stuck.  
Cannot escape.

Employ traps on residential properties to  
survey and control invasive *Aedes* mosquitoes

# Effectiveness of GAT

The effectiveness of the trap depends on removal of other breeding sites. The GAT kill female mosquitos and their eggs preventing population growth.

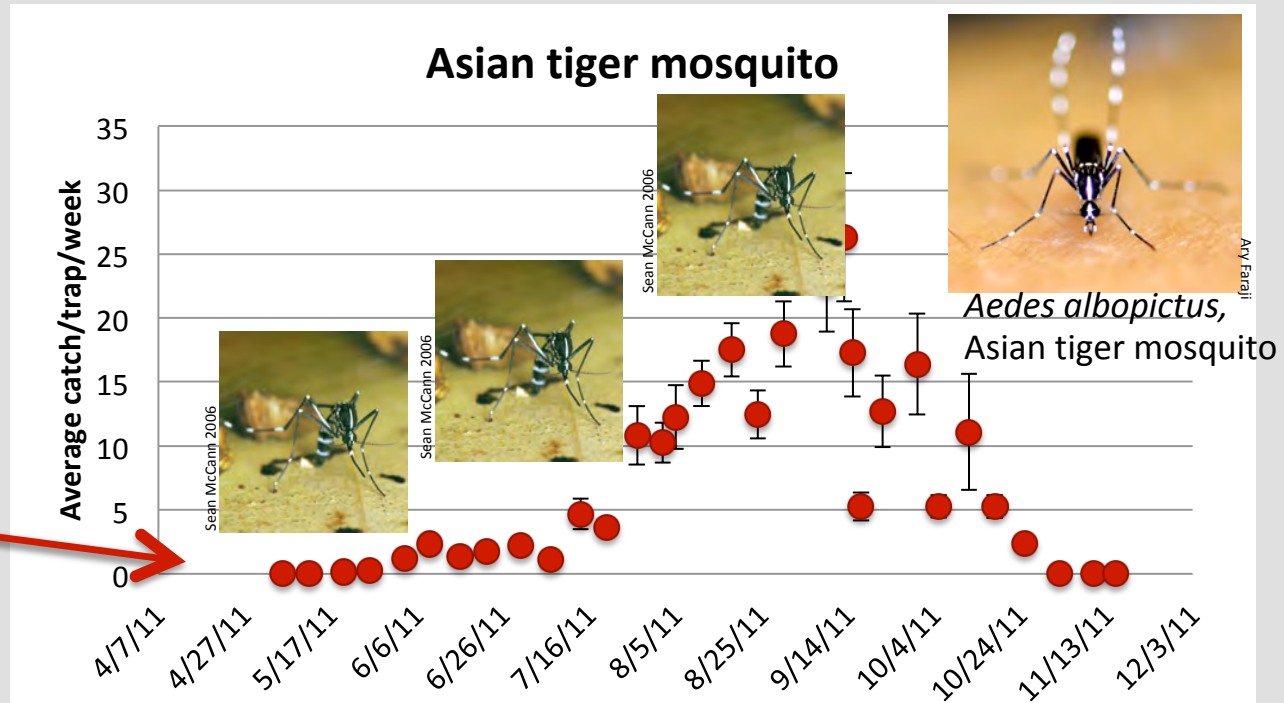


GATs act as "sinks"



Dina Fonseca

*Aedes* mosquitoes survive Winter as eggs



GAT are most effective if deployed early when populations are still small. Prevent "compound growth" over the summer.

# A Plan for Community-Based Mosquito Control

Every resident shall:

1. Eliminate breeding sites (containers, etc.)  
from their yards.
2. Provide GAT as an alternative breeding site.

***Best to start early in the season since the  
population multiplies exponentially.***



# Take Back Our Yards

For the past 3 years, the Town of University Park has focused on elimination of breeding sites for the Asian Tiger mosquito (*Aedes albopictus*). The program, “Take Back Our Yards” includes extensive education of residents with yard inspections and surveillance by a town intern



In 2016 the community started a GAT based program to enhance mosquito control

**THIS IS THE PROGRAM WE ARE FOCUSING ON IN THIS WEBINAR**

## Support UP's Mosquito Program

# A Community Based Mosquito Control: what worked

- A significant number of UP residents were interested in purchasing the GATs.
- Within a week of the original decision to use GATs, several residents had ordered 4 or more.
- A volunteer committee created a Google site, a Gmail account, plus an online form to register contact information of trap owners.
- A means of communicating with trap owners and our scientific advisor became available.

# A Community Based Mosquito Control: bumps on the road

The US distributor soon ran out of GATs and traps orders were delayed or cancelled.

Communication with many who eventually purchased traps was delayed, confused, or lost.

Most traps were not set-up until late in the mosquito season, if at all.

# A Community Based Mosquito Control: the good News

For a period of several weeks, there were more than 200 GATs in University Park on 95 properties (~10%).

35 residents own GATs. About 60 others borrowed a GAT from Rutgers University.

Groups of adjacent properties organized to deploy GATs. One block had GATs in 19 of 21 yards!

Surveillance using the GATs allowed a spatial surveillance that revealed localized mosquito hotspots.

# A Community Based Mosquito Control: the bad News

More than half of the residential properties in UP have yet to have a yard inspection to identify breeding sites needing elimination.

Many of us overlook breeding sites due to lack of knowledge or misunderstanding.

Resident turnover or Summer vacation lead to interruption in oversight

# The bottom line

Too many times traps were placed in yards with plenty of other breeding sites

Most traps were not set up early in the season.

## Frequently Found Mosquito Breeding Sites

- Untreated ornamental fountains and fishless ponds  
Corrugated extensions for downspouts
- Bamboo stands, small containers with water unseen under thick vegetation, abandoned toys
- Obvious water holding containers in vacationer's yards

# The Result

Control by mass deployment of GAT not possible because (1) too much larval habitat still existed

(2) Too few traps deployed

and

(3) most GATs were deployed late in the season

Instead, we used the GATs as surveillance tools and the summer of 2016 as a trial.

# A Learning Experience

What We Have Learned



Better results are achieved when residents are actively engaged and do not assume a passive role ← **CRITICAL**



# The GAT is Easy to Use

1. Take a look regularly to check:
  - They have not been knocked over
    - There is enough water
    - The dunk is still floating
2. Reapply canola oil on the dome monthly.

# Neighbors Working Together

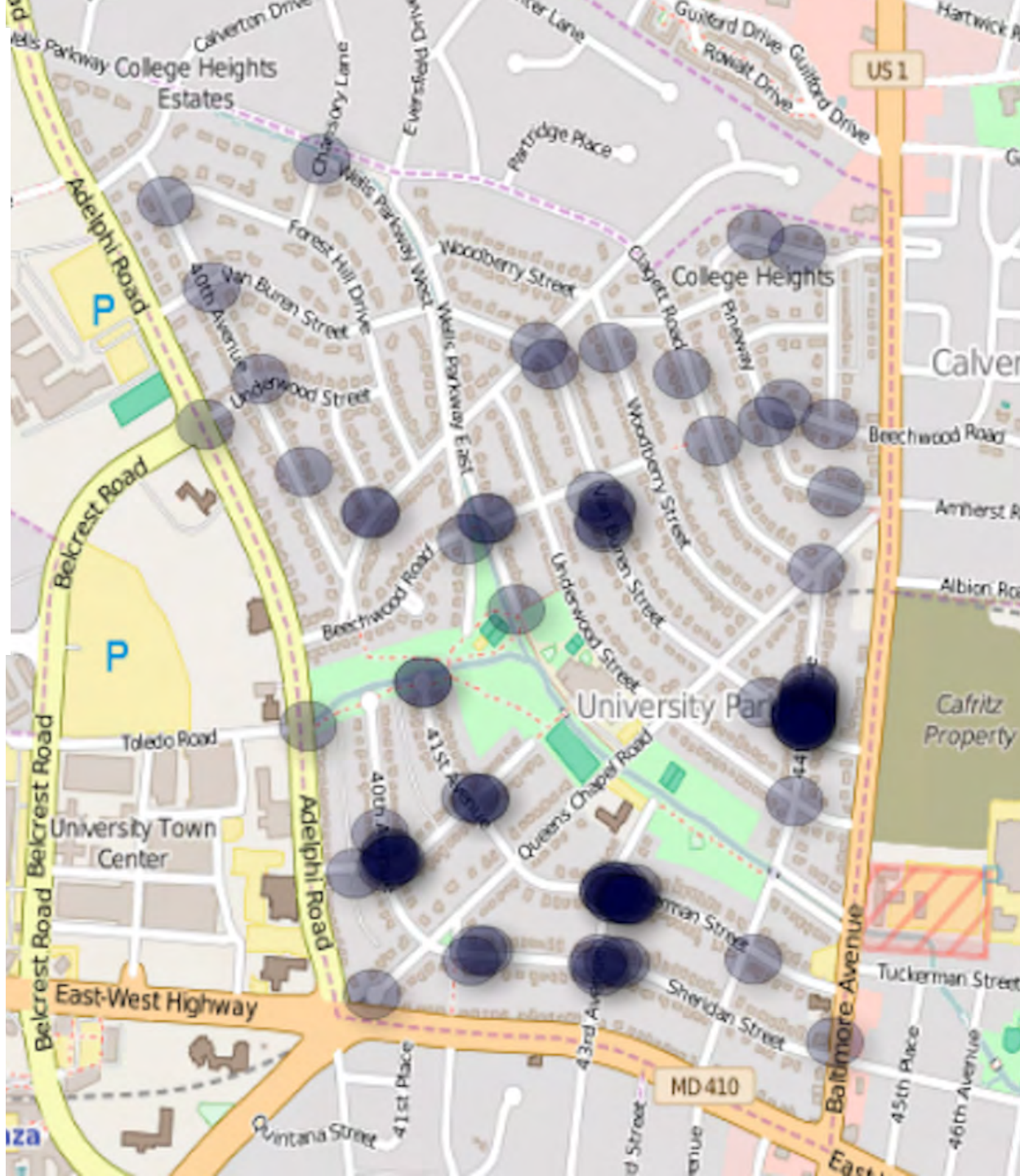
Successful experiences with the trap including set up and maintenance were to some degree dependent on the willingness of neighbors to help each other.

This includes offers to check that traps are functioning while neighbors are on vacation. (Often just a quick look is all that is needed.)

# Block Captains are Critical:

Blocks with residents willing to lead the effort had the highest level of participation. (Shown on map as darker and larger circles.)

**GATs used for surveillance - August 2016**  
86 residences (181 GATs)



# Communication is Key

Communication worked best when there was a give and take between community members.

The best learning was often the result of questions and comments from community members sharing their experience, asking for advice/help, etc.

# Community engagement



# Advise and Support Needed

Many GAT users initially requested advice and support.

The need for advice and support was sometimes evident when traps were checked and found ineffective due to errors in set up, maintenance, or competition with breeding sites that needed elimination.

# Heightened Awareness

Based on comments from trap owners, the presence of the trap provides a benefit beyond catching mosquitos. It also heightens the awareness of the resident to the need to monitor the property for standing water/ breeding sites.

Increased awareness leads to a...



# Spiral of knowledge



TRAPS



MOSQUITO  
CONTROL

Mosquito eggs  
& females  
killed

“Hands-on”  
Mosquito biology



More  
containers  
removed



+

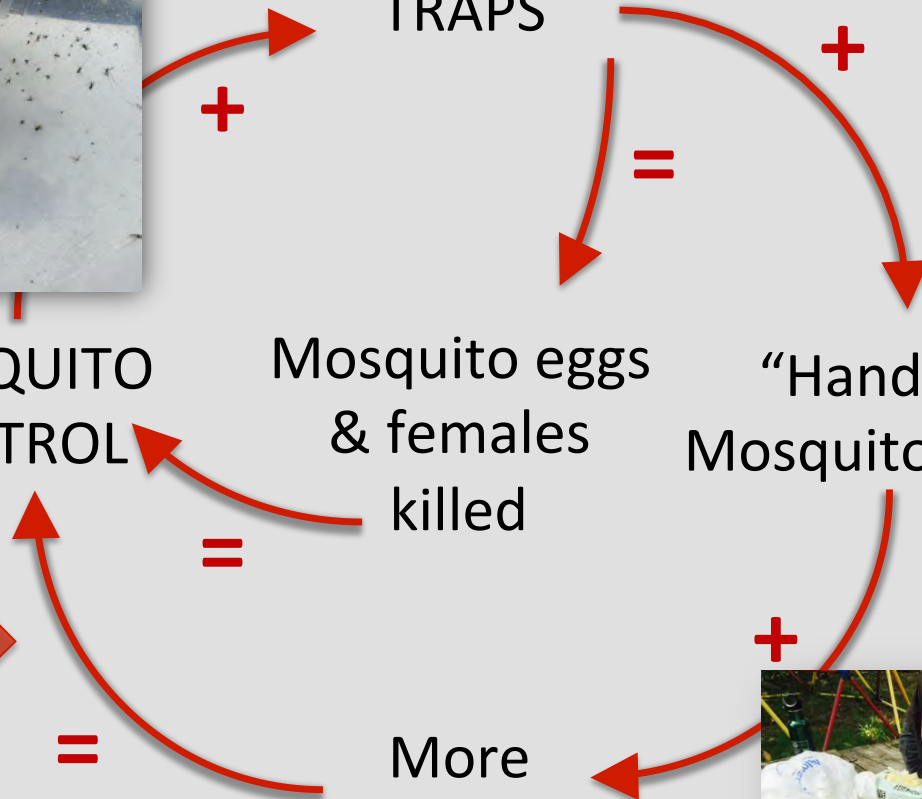
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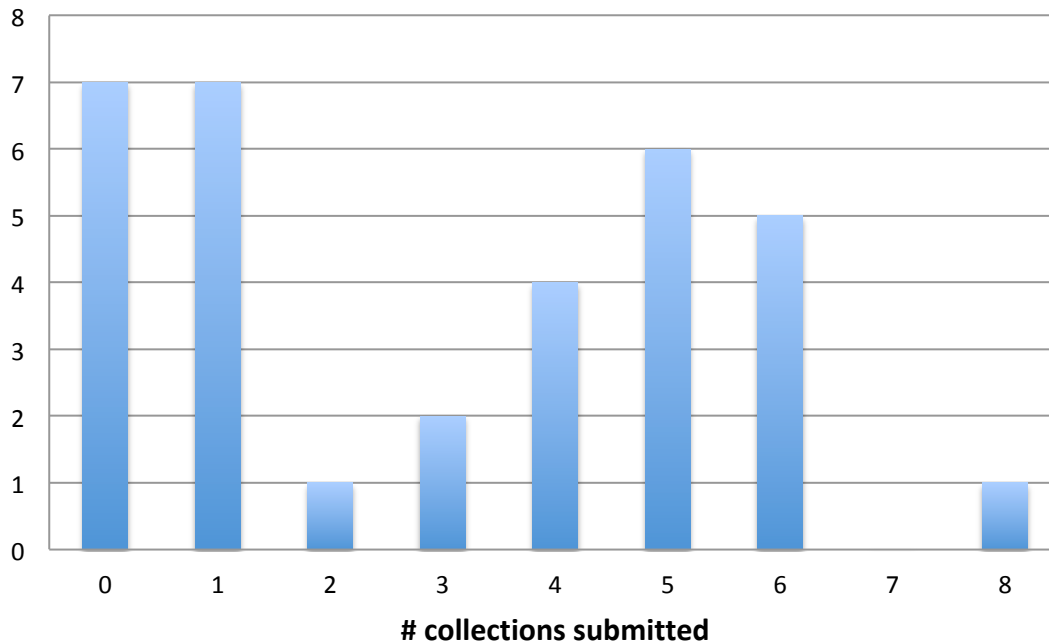
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# Surveillance by GAT Users

- Over 80% of GAT owners collected, packaged, labeled and delivered samples to a central location for ID and counting.

**Number of times residents submitted collections (11 Aug to 2 Sept 2016)**



- High resolution spatial analysis provided only to relevant residents
- Available upon request

# Surveillance

## Mosquito Count

Each GAT user can locate and remove mosquitos caught in the trap to count them.

Collections and submission can be made whenever the trap needs to be reset with fresh canola oil. GATs “survey” even as they control.

## Mosquito Identification

An expert (and usually a lab) is needed to identify the species and gender of mosquito.

# 2017 in University Park

- Start in late winter/early spring to organize
- Community Organizing – Block Captain Network
- Improved Communication
- Purchase of GATs by 80% of residents
- Coordinate with the town government
- Continue relationship with advisor and

Rutgers will perform a formal quantification of control efficacy if >60% residents buy and deploy GATs

[Dina.fonseca@rutgers.edu](mailto:Dina.fonseca@rutgers.edu)

# Review

- We have invasive mosquitos that are not only an annoyance but potential disease transmitters
- Need to eliminate the breeding sites (larval habitats) and also kill female adults and their eggs.
- Use of GATs requires active resident participation
- GATs can also be used for surveillance (counting and/or identification).
- Ongoing effort

# Our Google Site

<https://sites.google.com/site/mosquitocontrolup/gravid-aedes-trap>

The screenshot shows a Google Site page with a light green background. At the top, there are navigation tabs: 'GAT (Gravid Aedes Trap) Mosquito Control', 'Untitled', 'About the Project', and 'Sitemap'. Below the tabs is a breadcrumb trail: 'GAT (Gravid Aedes Trap) Mosquito Control >'. The main heading is 'About the Project'. A paragraph of text reads: 'Residents in the community participating in this experiment are taking action by 1) Eliminating Breeding Sites, 2) Employing and maintaining a trap or traps, and 3) supporting an effort to collect and survey trapped mosquitos.' Below this are three columns, each with a heading: 'Eliminating Breeding Sites', 'Employing and Maintaining a Trap', and 'Mosquito Survey and Identification'. The first column discusses the town of University Park's efforts to control the Asian Tiger mosquito population. The second column describes how residents can purchase traps and how Dr. Fonseca offers loans. The third column explains how to handle captured mosquitoes. A navigation sidebar on the right lists: 'Navigation', 'GAT (Gravid Aedes Trap) Mosquito Control', 'About the Project', 'Mosquito Collection', 'About Us', 'Trap', 'Instructions', 'Untitled', and 'Sitemap'.

GAT (Gravid Aedes Trap) Mosquito Control    Untitled    About the Project    Sitemap

[GAT \(Gravid Aedes Trap\) Mosquito Control](#) >

## About the Project

*Residents in the community participating in this experiment are taking action by 1) Eliminating Breeding Sites, 2) Employing and maintaining a trap or traps, and 3) supporting an effort to collect and survey trapped mosquitos.*

### Eliminating Breeding Sites

For the past several years, the Town of University Park has employed two mosquito interns to support an effort to control the Asian Tiger mosquito population. One aspect of this effort is identifying and eliminating breeding sites for this invasive mosquito.

Residents can request a yard inspection for help in identifying places where the female mosquito will lay its egg. The female places the egg where water will appear and stay on the egg long enough for the egg to develop into larvae (approximately 7 days).

Possible Breeding Areas Include:  
Clogged Gutters and Drainpipes

### Employing and Maintaining a Trap

Residents have voluntarily purchased one or more traps for their yards. In addition to these individually purchased traps, Dr. Fonseca has offered 50 traps on loan to residents who have volunteered to participate in this research effort.

Elimination of other breeding sites will increase the odds that the female Asian Tiger will choose to enter the trap. Although these mosquitos do not travel far, they travel far enough that elimination of other breeding sites/areas in neighboring properties will improve the effort.

The traps are placed in shady areas perhaps

### Mosquito Survey and Identification

Residents who support the research effort to identify and count the captured mosquitos might choose to check their own traps frequently. The specimens can be placed on a paper towel and then deposited in a small covered plastic container or a plastic freezer bag and kept in the freezer for eventual pickup and delivery to Dr. Fonseca.

Dr. Fonseca is assembling a group of volunteers to collect mosquitos from the traps on loan during three weeks in August. More information will be posted as it becomes available. However, high school students living in University Park may contact us to learn about volunteering for this collection

Navigation

- ▼ GAT (Gravid Aedes Trap) Mosquito Control
  - About the Project
- ▼ About the Project
  - Mosquito Collection
- About Us
- Trap
- Instructions
- Untitled
- Sitemap

# Our Email Address

[Mosquito.control.up@gmail.com](mailto:Mosquito.control.up@gmail.com)

# Thank You!

## Residents of University Park

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