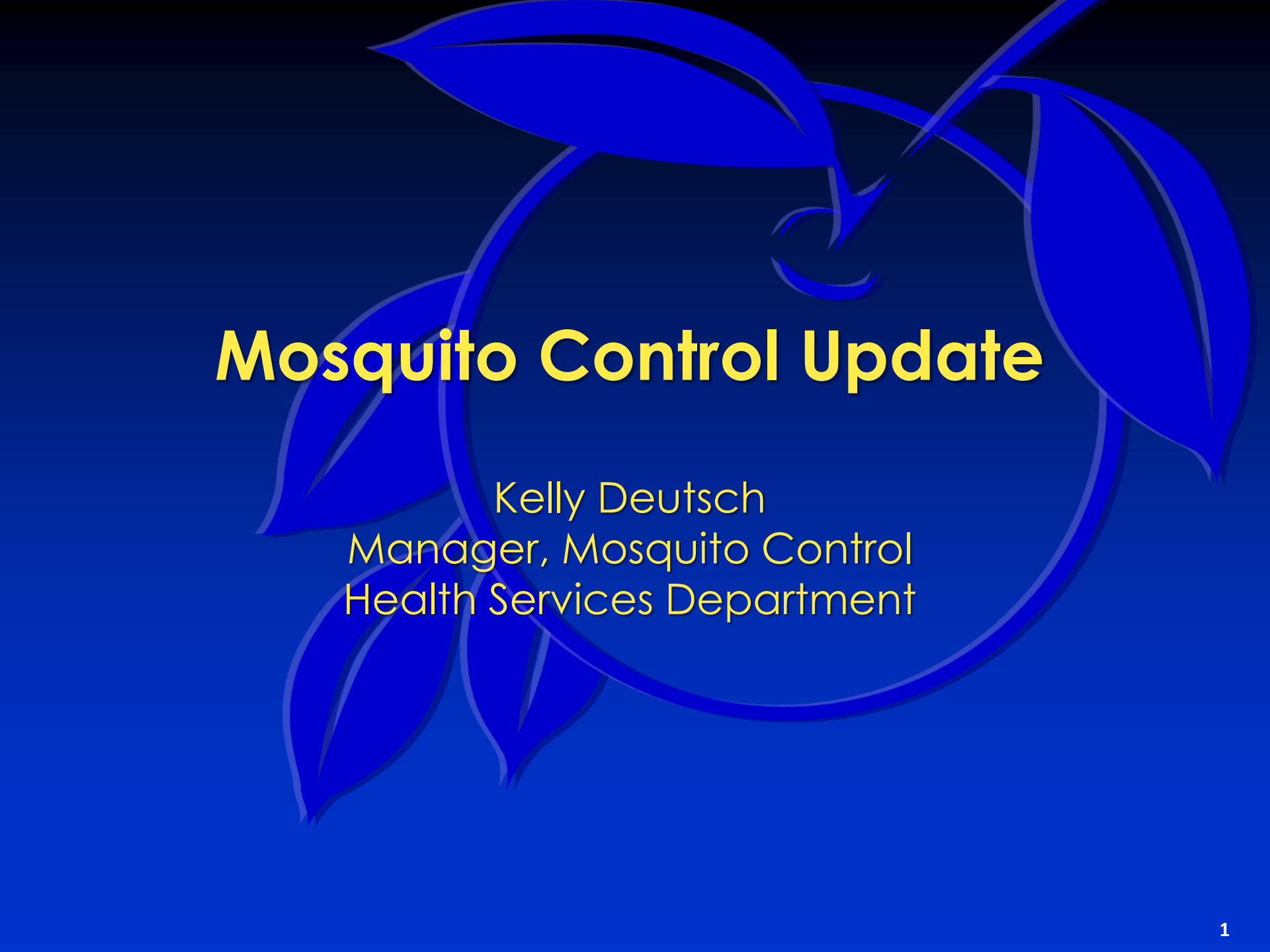




# Mosquito Control Update

Kelly Deutsch  
Manager, Mosquito Control  
Health Services Department



# Presentation Overview

- Mosquito Control Overview
- Control Methods
- Mosquito-Borne Diseases
- Zika Update & Response Plans
- Summary



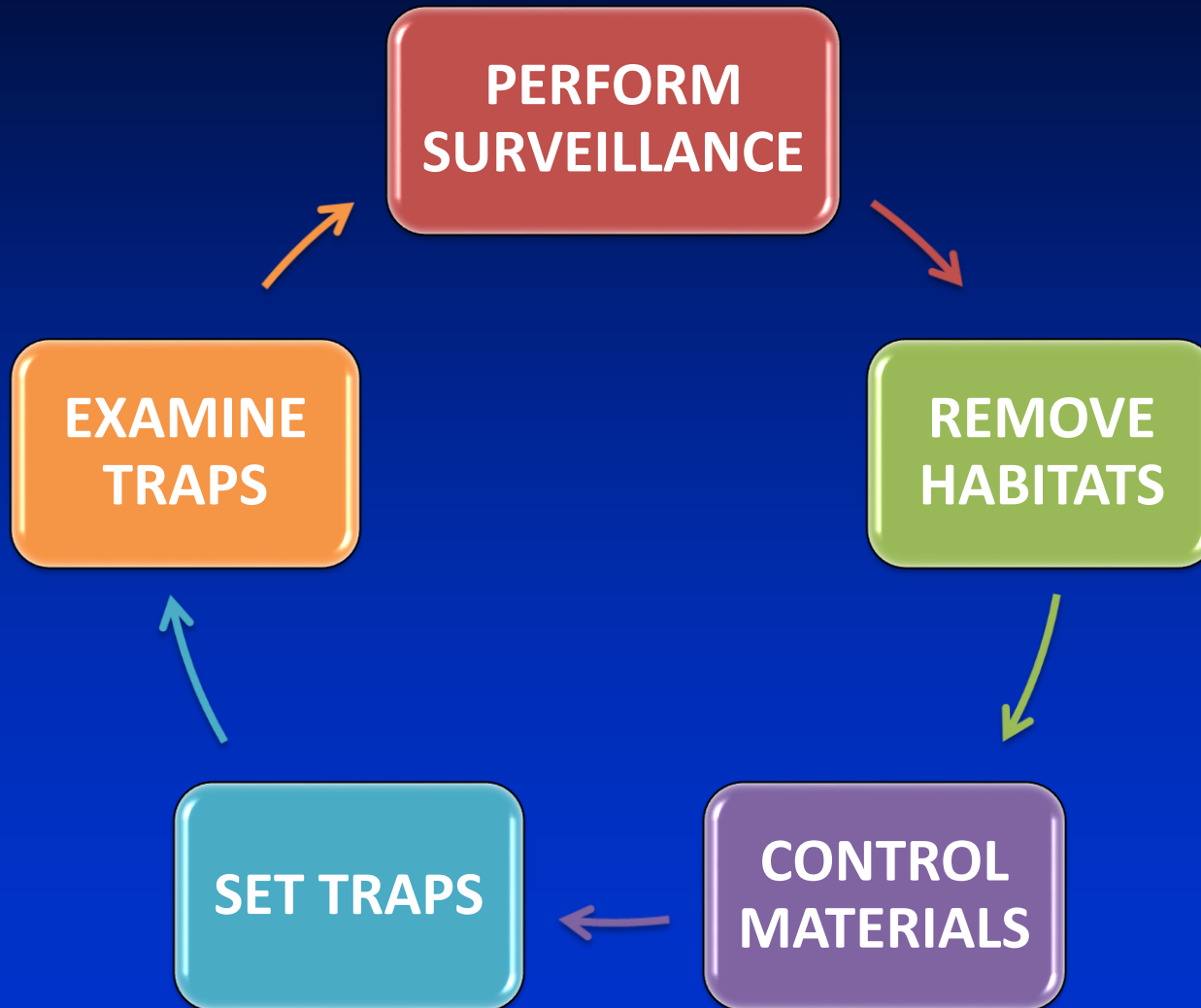
# Mosquito Control Overview



***"Integrated Mosquito Management"***



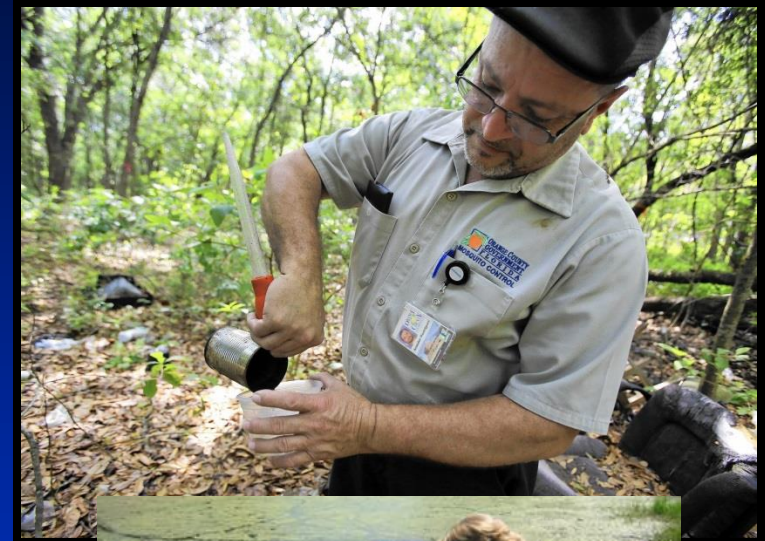
# Mosquito Control Overview





# Mosquito Control Overview

- **29 Full Time Personnel**
  - Seasonal employees added as needed
- **26 vehicles on the road performing various functions**
  - Scheduled and unscheduled site visits
  - Setting and collecting traps
  - Removing artificial habitats
  - Applying control materials







# Mosquito Control Overview

## Trapping and Identification





# Presentation Overview

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# Control Methods

## REMOVE HABITATS

**Removal of Standing  
Water**

**Homes, Public Areas,  
Construction Sites**

**Most Effective Method  
of Control**

## CONTROL MATERIALS

**Larvicides &  
Adulticides**

**Added to Water in  
Artificial Containers**

**Applied by Hand, Truck  
Mounted Sprayer or Aircraft**





# Control Methods

REMOVE  
HABITATS

Removal of Standing  
Water

Homes, Public Areas,  
Construction Sites

Most Effective Method  
of Control



***- Citizen Assistance is Vital -***





# Control Methods

## Juvenile Mosquito Control

Added to standing water

## Adult Mosquito Control

Ultra-Low Volume Application  
Barrier Treatments

**CONTROL  
MATERIALS**

Larvicides &  
Adulticides

Added to Water in  
Artificial Containers

Applied by Hand, Truck  
Mounted Sprayer or Aircraft



# Control Methods

## *Bti*

- Active ingredient derived from natural occurring bacteria in soil
- Low risk for humans and the environment
- Highly effective against *Aedes aegypti* & *albopictus*

## Botanicals

- Active ingredients break down rapidly in sunlight
- Rigorously tested by EPA, low risk to humans
- Low risk for animals and pets
- Low risk to non-targets due to night time use and rate

## Naled

- Extensive use since 1950s
- Degrades immediately on contact with surfaces, water and in sunlight
- Has not been shown to cause health problems in humans
- Does not harm animals, fish or honey bee populations when applied according to law



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# Mosquito-Borne Diseases

Not all mosquitoes are the same. Different mosquitoes spread different viruses and bite at different times of the day.



## Type of Mosquito

## Viruses spread

## Biting habits



*Aedes aegypti*,  
*Aedes albopictus*

Chikungunya,  
Dengue, Zika

Primarily daytime, but  
can also bite at night



*Culex* species

West Nile

Evening to morning





# Mosquito-Borne Diseases

## How Do Mosquitoes Spread Viruses like Zika?

Person gets infected by mosquito or human contact

*Aedes* mosquito bites the infective person during 1<sup>st</sup> week of infection

Infected mosquito lives long enough for virus to multiply

Infective mosquito bites another person and process is amplified in a population



# Mosquito-Borne Diseases

## Established Diseases in Florida

- Chikungunya
- Dengue Fever
- Dog Heartworm
- Eastern Equine Encephalitis
- St. Louis Encephalitis
- West Nile Virus
- **ZIKA VIRUS**
- *Yellow Fever (on the horizon)*





# Mosquito-Borne Diseases

- *Aedes aegypti*

- Because they live near and prefer to feed on people, they are more likely to spread viruses than other types of mosquitoes

- *Aedes albopictus*

- These mosquitoes feed on animals as well as people, they are less likely to spread viruses like Zika, dengue and chikungunya





# Mosquito-Borne Diseases

- *Aedes aegypti*

Noticeable black and white markings on their body and legs

- *Aedes albopictus*

Unlike other mosquitos, they are active and bite during the daytime

Peak biting periods are early morning and in the evening before dusk





**These mosquitoes live in tropical, subtropical, and in some temperate climates.**





# Mosquito-Borne Diseases

## Zika Virus



1947

1952

2007

2014

2016

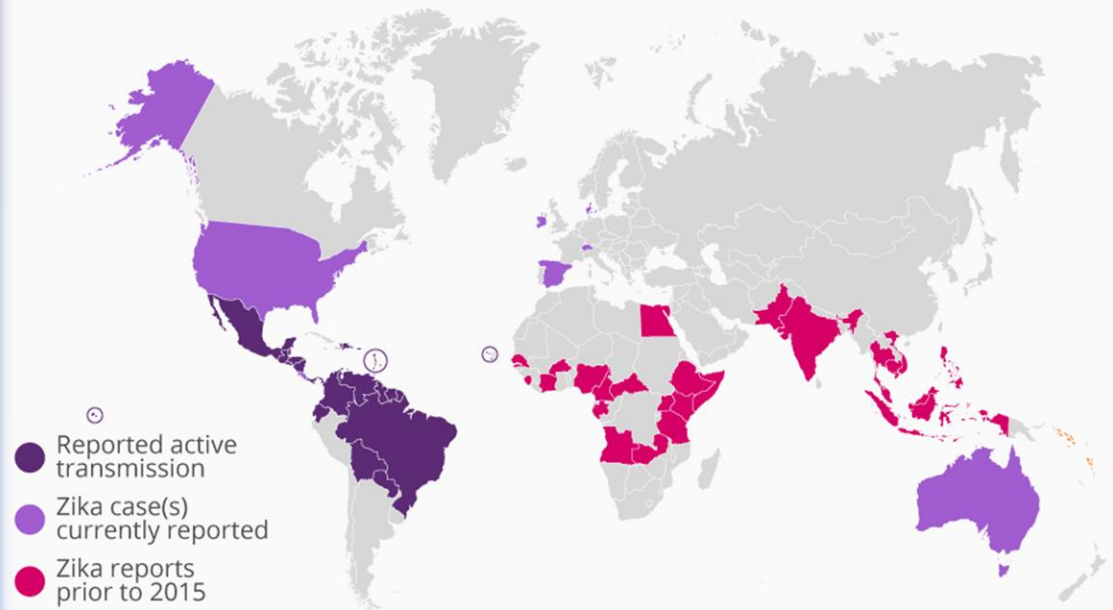




# Mosquito-Borne Diseases

## The Spread Of The Zika Virus

Countries and territories with active Zika virus transmission\* and reported cases



## Zika Virus

1947

1952

2007

2014

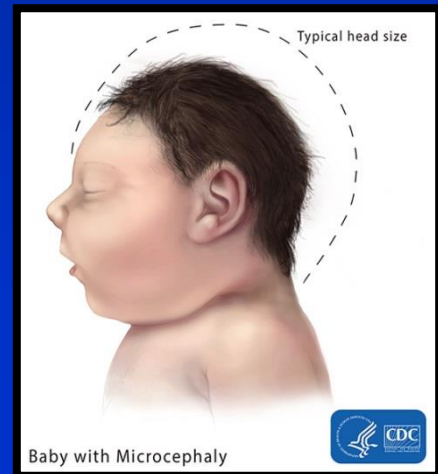
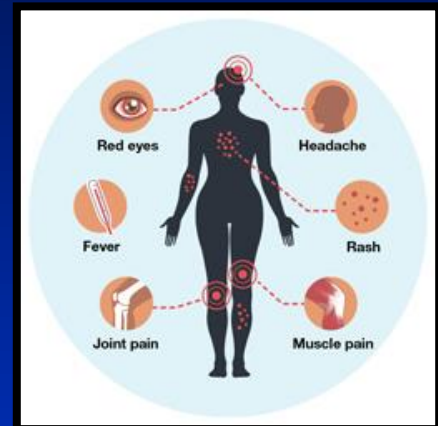
2016



# Mosquito-Borne Diseases

- **Clinical Presentation**
  - Usually mild symptoms that resolve in 1 week
  - 80% of those infected have no symptoms
  - Rash, fever, joint pain, conjunctivitis
  - Linked to microcephaly and fetal demise
- **Blood or urine tests required for confirmation**
- **No treatment or vaccine available yet**
- **One in 10 pregnant women with Zika Virus had a fetus or baby with neurologic defects**

## Zika Virus





# Mosquito-Borne Diseases

*Main source of protection is to limit exposure*

- Use EPA registered insect repellent
- Cover up with long sleeve shirt & pants
- Control mosquitos outside and inside your home

## Active ingredient

Higher percentages of active ingredient provide longer protection

DEET

Picaridin (known as KBR 3023 and icaridin outside the US)

IR3535

Oil of lemon eucalyptus (OLE) or para-menthane-diol (PMD)

2-undecanone



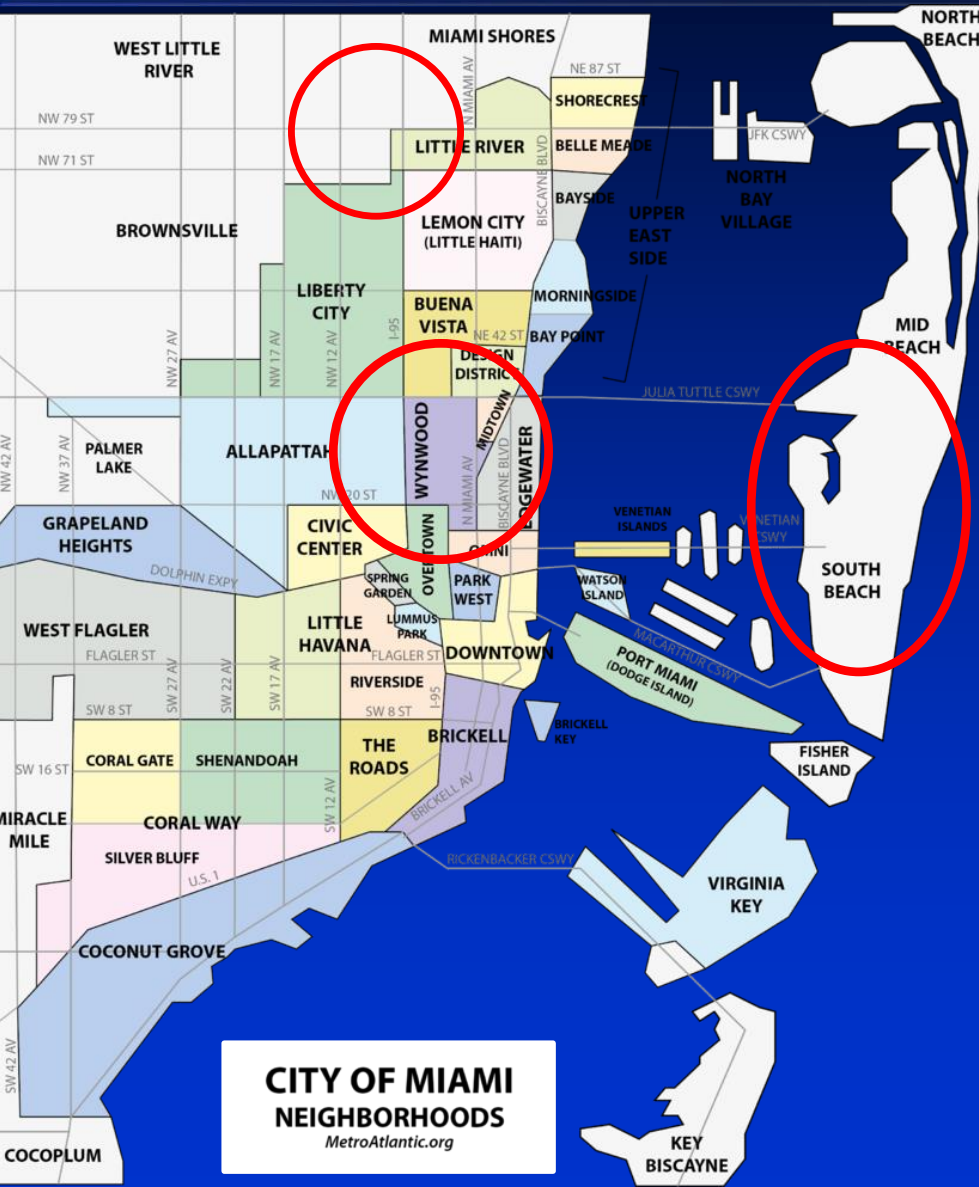


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# Zika Update & Response



## 2016 Local Transmission

- Miami-Dade County
- First travel warning from within continental USA
- Total of 272 cases
- Significant impact on local economy
- Aggressive Mosquito Control operation
- Outbreak controlled quickly



# Zika Update & Response

| Florida (Statewide)                        | 2016  | 2017 |
|--------------------------------------------|-------|------|
| <i>Travel-Related Infections of Zika</i>   | 1,118 | 33   |
| <i>Locally Acquired Infections of Zika</i> | 285   | 2    |
| <i>Undetermined</i>                        | 46    | 7    |
| <i>Pregnant with Lab-Evidence of Zika</i>  | 296   | 23   |





# Zika Update & Response

| <b>OC Mosquito Control Zika Activity</b>            | <b>2016</b>   | <b>2017</b>   |
|-----------------------------------------------------|---------------|---------------|
| <b><i>Suspect cases of Zika</i></b>                 | <b>797</b>    | <b>159</b>    |
| <b><i>Number of Properties Visited</i></b>          | <b>79,700</b> | <b>22,200</b> |
| <b><i>Confirmed Zika Cases (Travel related)</i></b> | <b>167</b>    | <b>1</b>      |
| <b><i>Confirmed Locally Transmitted Zika</i></b>    | <b>0</b>      | <b>0</b>      |
| <b><i>Mosquito Tests Positive for Zika</i></b>      | <b>0</b>      | <b>0</b>      |



# Zika Update & Response

## What happens when ZIKA is SUSPECTED

- Patient suspected to have ZIKA is seen by a community physician
- Physician orders ZIKA blood or urine test
- FL-DOH mandatory reporting even before results are back
- FL-DOH notifies OC Mosquito Control of a suspected case
- Location of case provided (no specific address)



# Zika Update & Response

## What We Do For every SUSPECTED case of ZIKA

- Crews perform surveillance within 225 feet of location provided by DOH
- Removal of breeding habitats & set traps
- Apply control materials in the area
- Leave door hangers
- Return in 24 hours
- If traps have *Aedes* mosquitos, repeat the above and test mosquitoes for ZIKA





# Zika Update & Response

Access to private property is a challenge during surveillance and abatement efforts





# Zika Update & Response

## *What We're Doing Now...*

### ■ Operations

- Assessing staffing needs for upcoming season
- Evaluating new control modalities



### ■ Proactive Communications

- Mosquito Control has been featured in dozens of media reports
- OC website has links to education and PSAs regarding Zika
- Consistent social media outreach





# Zika Update & Response

## *What We're Doing Now...*



- Engagement with Community
  - Education to CFHLA, Private Pest Control, EMS, GOAA, OCPS
- Coordinating with State and Local Public health
- Engagement with Staff
  - Collaboration with HR, Directors and Managers







# Zika Update & Response

## *If Locally Transmitted Case Occurs...*

- **Orange County Mosquito Control**
  - Increase Surveillance & Abatement
  - Utilize Citizen Emergency Response Teams, HOA volunteers, and Medical Reserve Corps for manpower
  - May require additional temporary staffing
- **Department of Health**
  - Test for Zika among contacts of positive cases
  - Facilitate access to private property
  - Maintain high degree of coordination with County





# Zika Update & Response

## *If Locally Transmitted Case Occurs...*

- **Orange County Communications**
  - Organize press releases, PSAs, and media events to inform and engage the community
  - Coordinate messaging with partners in tourism, schools, etc.
- **Orange County Emergency Management**
  - Coordinate with MC to assess resource gaps
  - Liaison with State EOC, FL DOH and CDC
  - Assist in organizing community outreach





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# Summary

- Integrated Mosquito management coordinates the efforts of Public Health, Mosquito Control and Public information
- Active efforts and planning currently happening
- The most effective method to control mosquito populations is remove their breeding habitat

***- EVERYONE CAN DO THIS -***

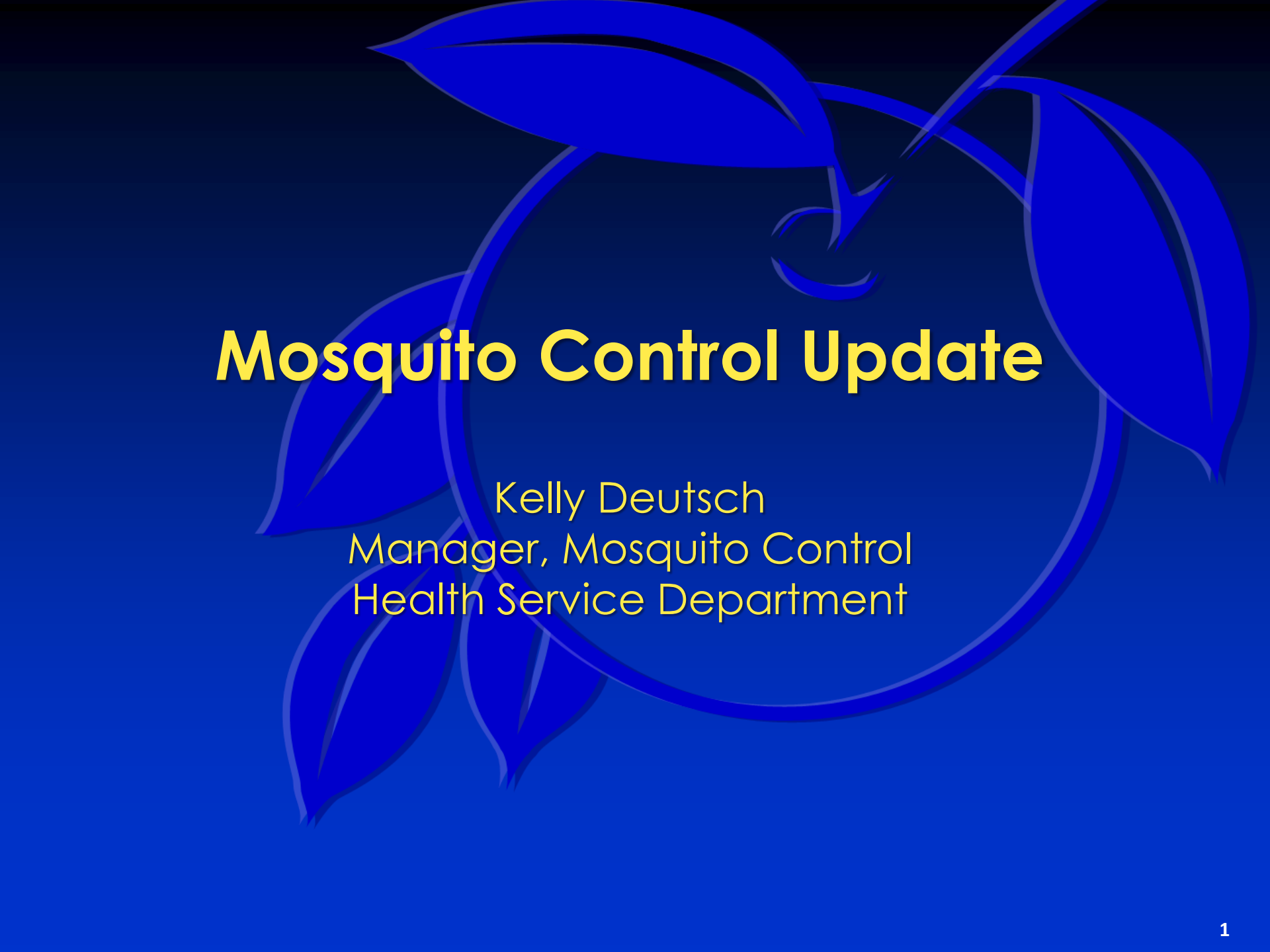
- When Control Materials are used, we carefully select those with the best safety and environmental profile



# Summary

- Mosquito-borne diseases are a serious public health threat
- Best way to protect yourself and family is cover up
- Use EPA registered repellent
- And control mosquitoes outside and inside your home
- CDC, Florida DOH and OC websites are great resources to learn more





# Mosquito Control Update

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Manager, Mosquito Control  
Health Service Department