

Office of Management and Budget

**Findings and Recommendations
Associated with the Mosquito Control Functions
for the Public Works and
Waste Management Department**

November 7, 2012

Project Objectives

To gain a detailed understanding of Mosquito Control activities, and to optimize the use of resources in order to achieve the Division's mission.

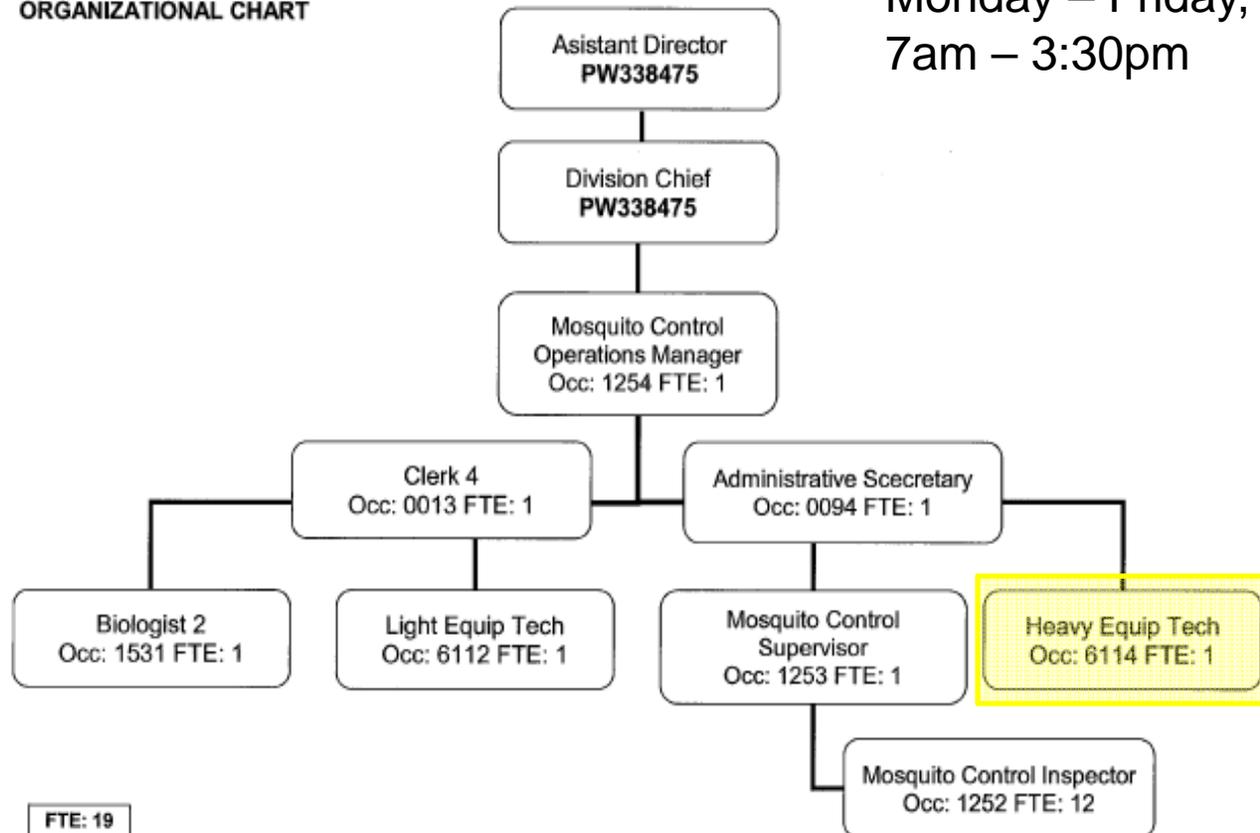
Methodology

In conducting its review, OMB:

- Collected and reviewed background information such as relevant legislation, financial data, and an overview of Division responsibilities
- Reviewed performance data and obtained detailed information regarding this data and associated processes and procedures; this included both output and outcome measures
- Conducted an activity analysis in order to gather detailed information regarding staff activities throughout the year; analyzed this data, along with relevant workload data
- Surveyed peer jurisdictions in Florida to obtain comparative data and best practices

Mosquito Control Division

Public Works and Waste Management Department
FY 2012-13
Division Name: Mosquito Control; Division No. 08
ORGANIZATIONAL CHART



Inspectors work
Monday – Friday,
7am – 3:30pm

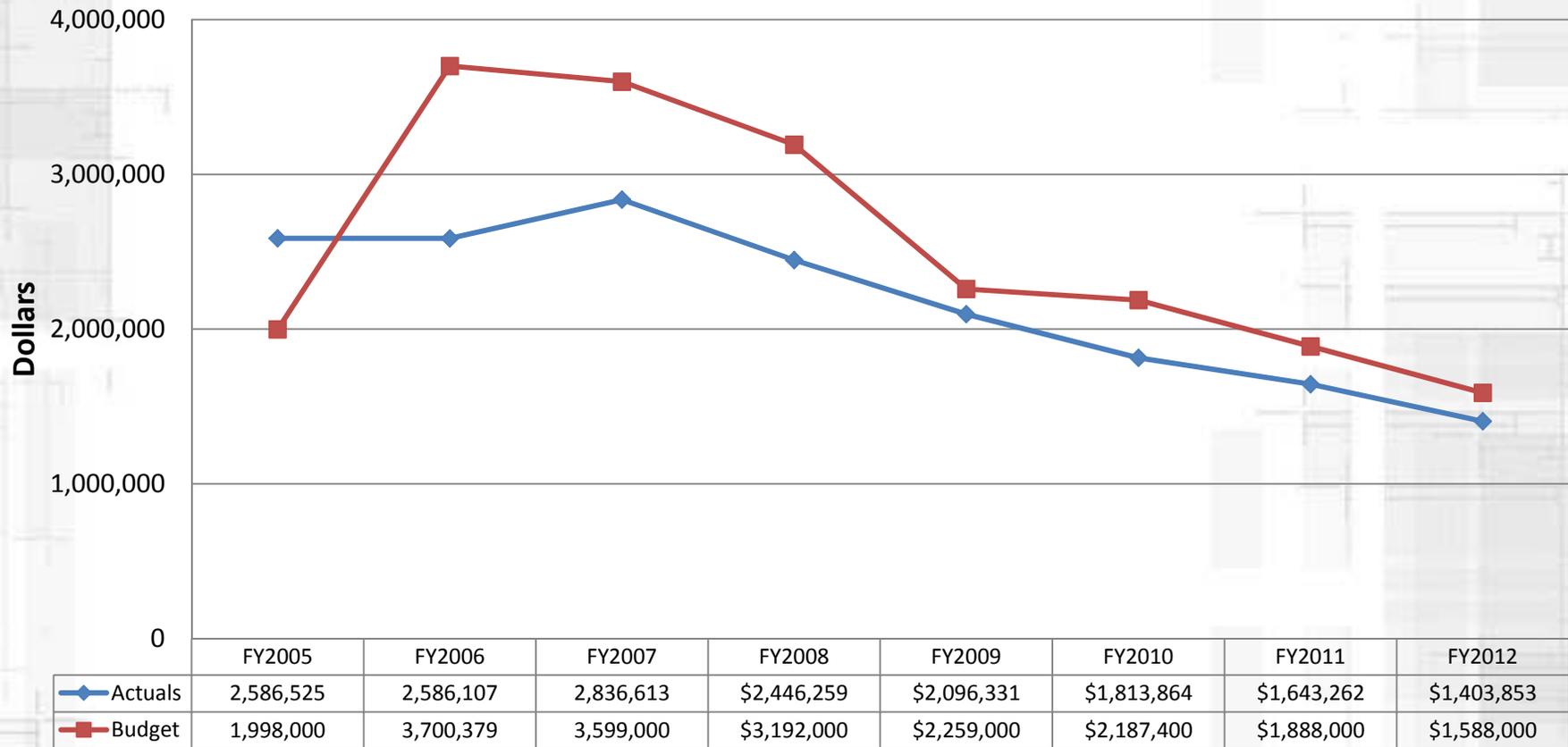
19 Full time positions
as of August 2012.

12 Inspectors
1 Supervisor
1 Biologist
1 Clerk
1 Admin. Secretary
1 Manager
2 Technicians

*Note: 1 Heavy
Equipment Technician
eliminated during
budget process for an
FY2012-13 total of 18*

As of August 2012

Mosquito Control Financial History per FAMIS



Budget spiked in FY2006 and steadily declined (57%) by FY2012
 Actual expenditures reduced by 46% since FY2005

Budgeted Full Time Positions Since FY2005



* Mosquito Control merged within the Road, Bridge, and Canal Maintenance Division in FY 11-12

State Governing Rules

Chapter 388 of Florida Statutes

Chapter 5E-13 of the Florida Department of
Agriculture and Consumer Services

- State funding requirements
- Qualifications for director
- Spraying criteria
- Administrative and operational procedures
- Protection of natural resources

Activity Analysis

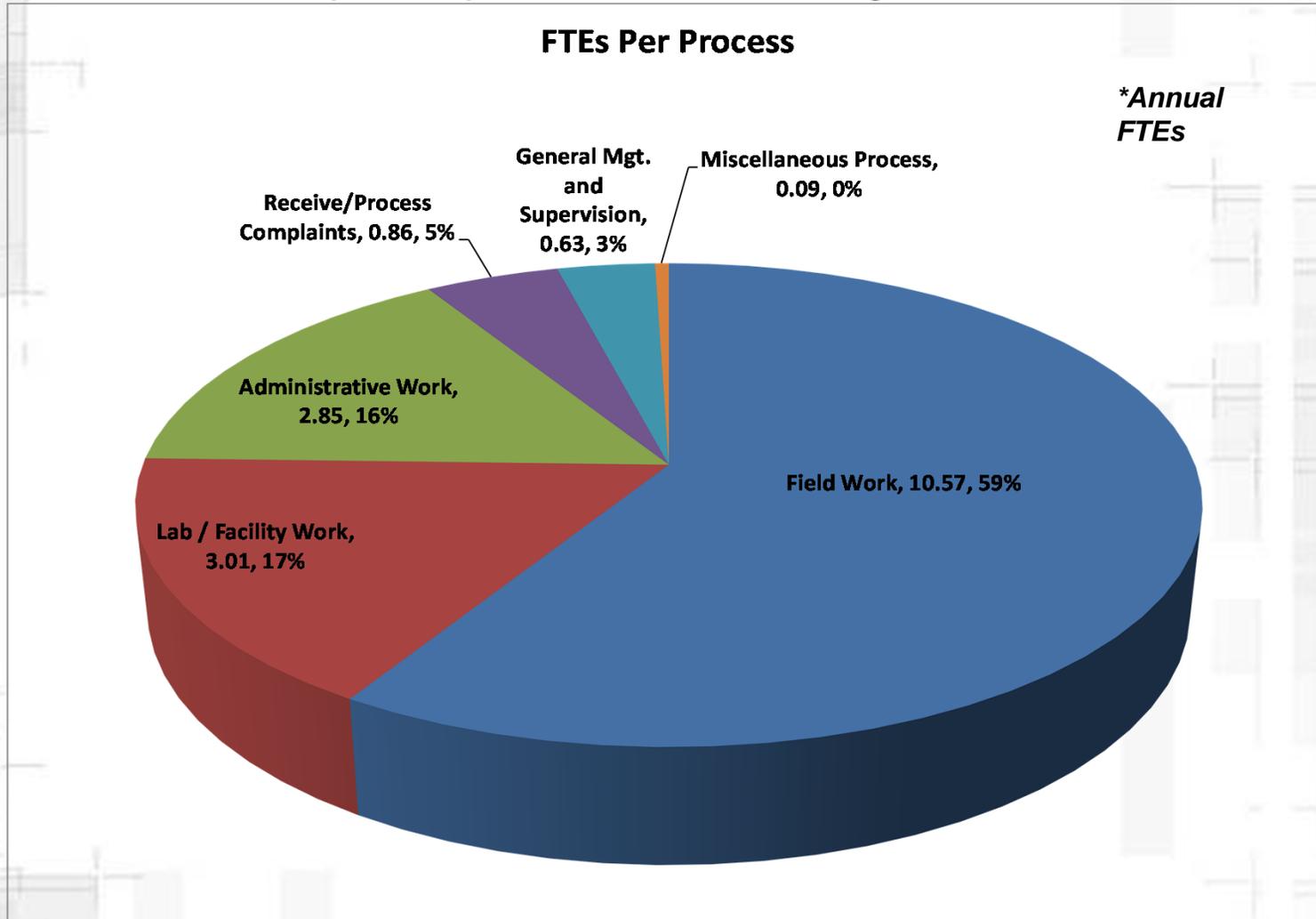
OMB developed an activity-based cost model that details the percentage of time spent on each major process by employees involved in mosquito control, broken down by month of the year (*see Exhibit A for major processes*)

This was accomplished by:

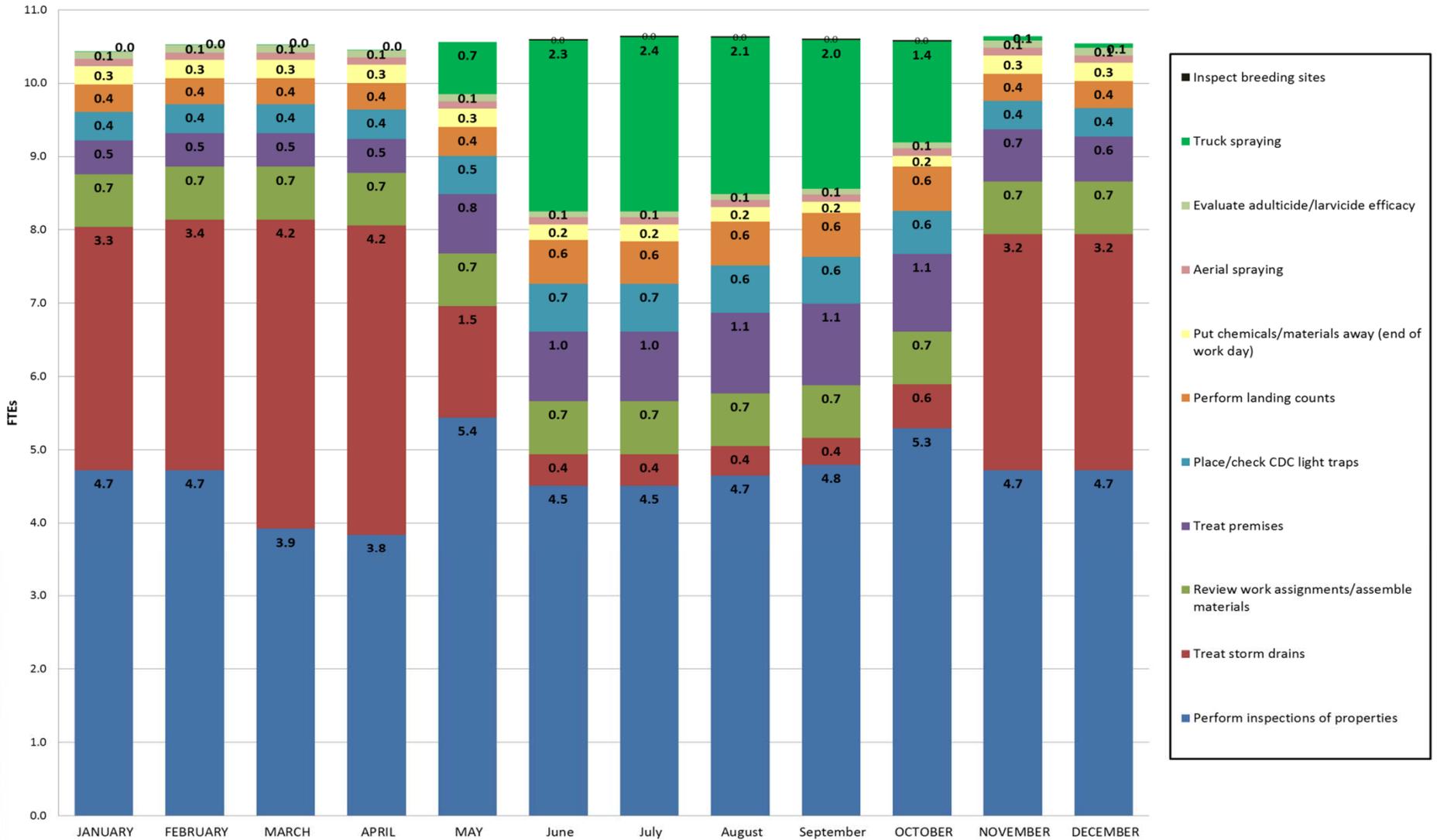
- collecting activity related data from 18 employees during a facilitated work session on August 29, 2012
- organizing the data by major processes, months of the year and other relevant variables
- analyzing the data and developing preliminary findings

Activity Analysis Findings

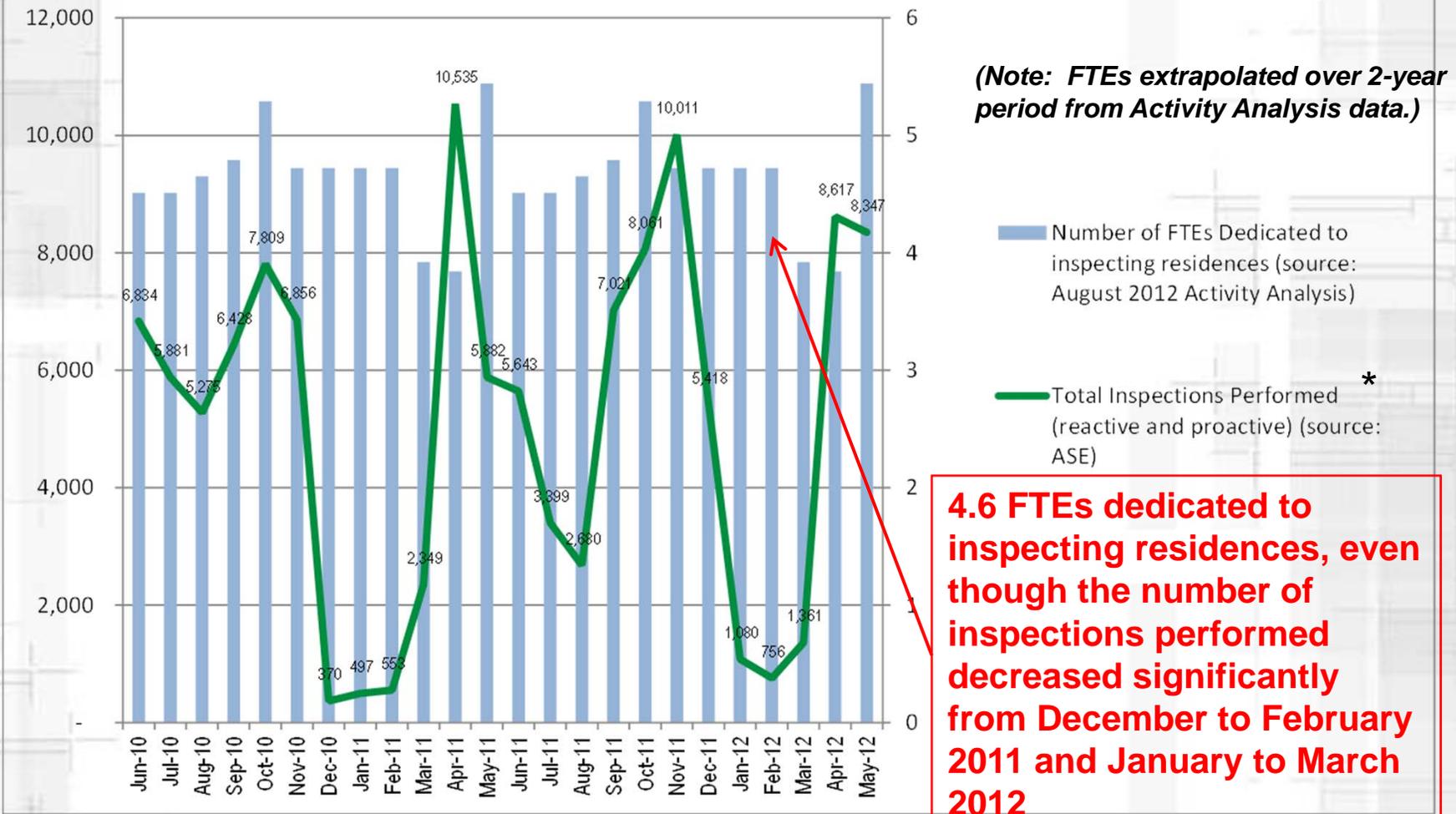
Activity Analysis conducted August 29, 2012



FIELD WORK: Activities by Month



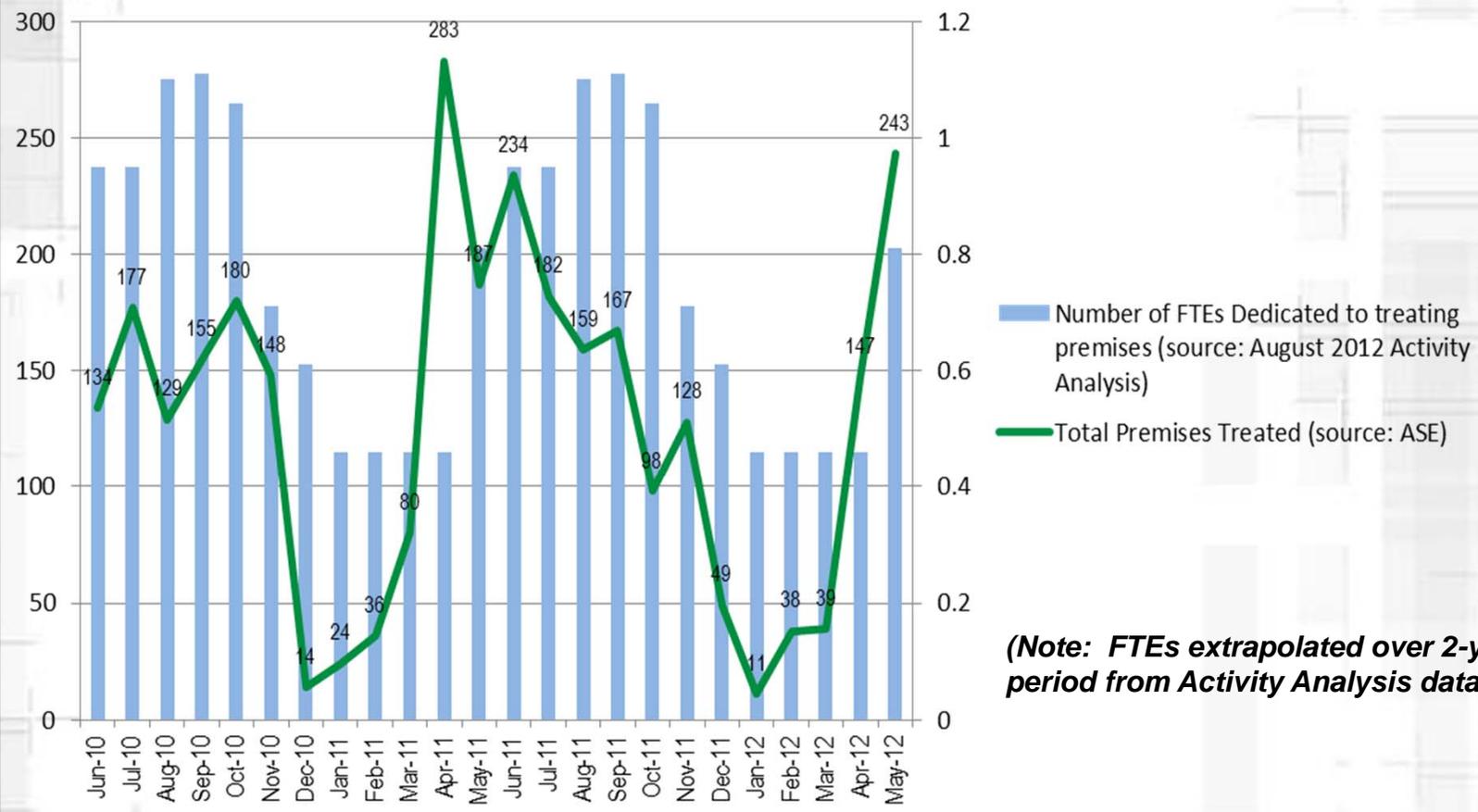
Number of FTEs Dedicated to Inspecting Residences vs. Number of Proactive and Reactive Inspections Performed, June 2010 - May 2012



4.6 FTEs dedicated to inspecting residences, even though the number of inspections performed decreased significantly from December to February 2011 and January to March 2012

* **“Residential Inspections”** are proactive inspections not associated with a service request. **Service Request Inspections** include inspections of properties surrounding the address of the complaint.

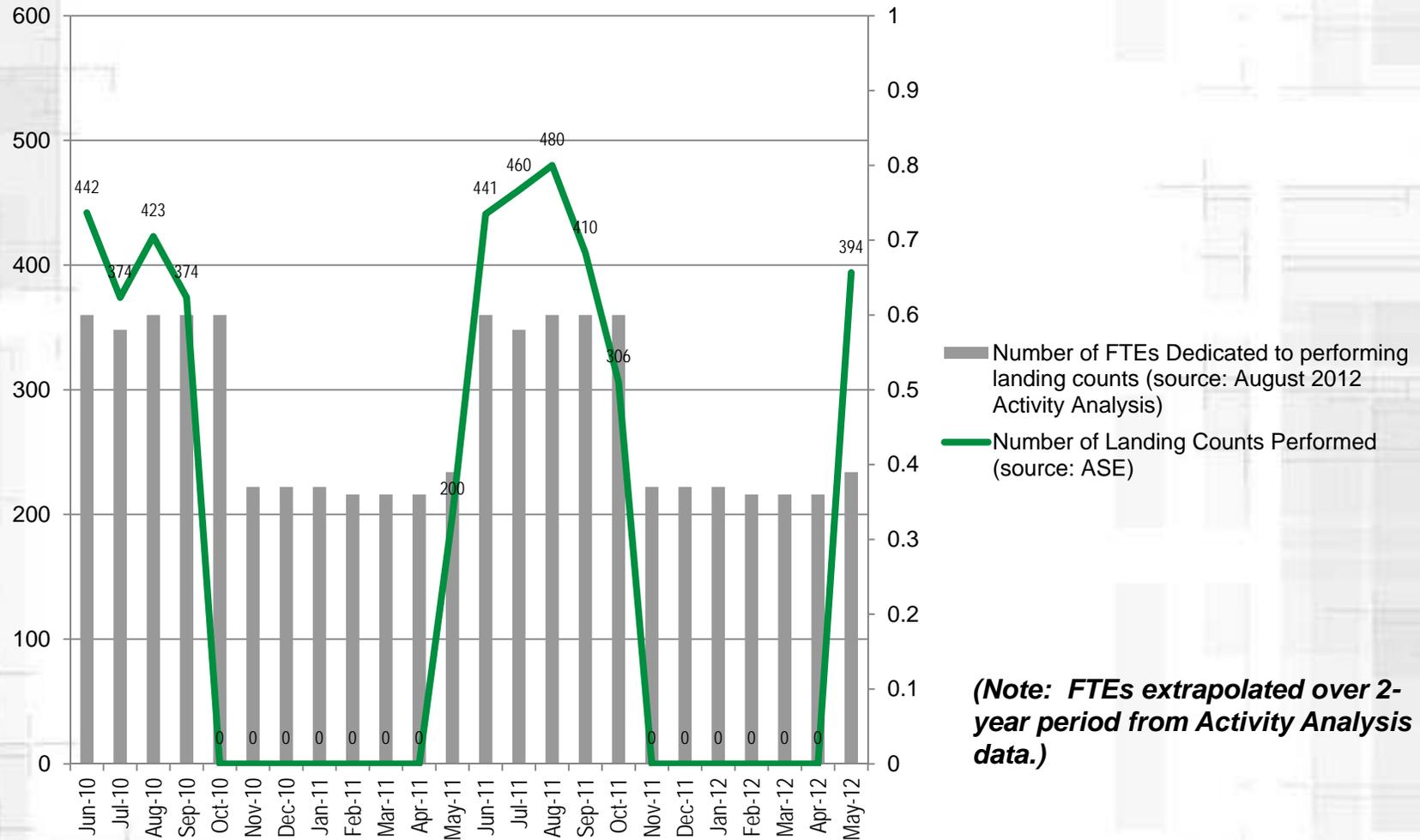
Number of FTEs Dedicated to Treating Premises (as reported in Activity Analysis) vs. Number of Premises Treated, June 2010 - May 2012



(Note: FTEs extrapolated over 2-year period from Activity Analysis data.)

Number of FTEs Dedicated to Performing Landing Counts vs. Number of Landing Counts Performed*, June 2010 - May 2012

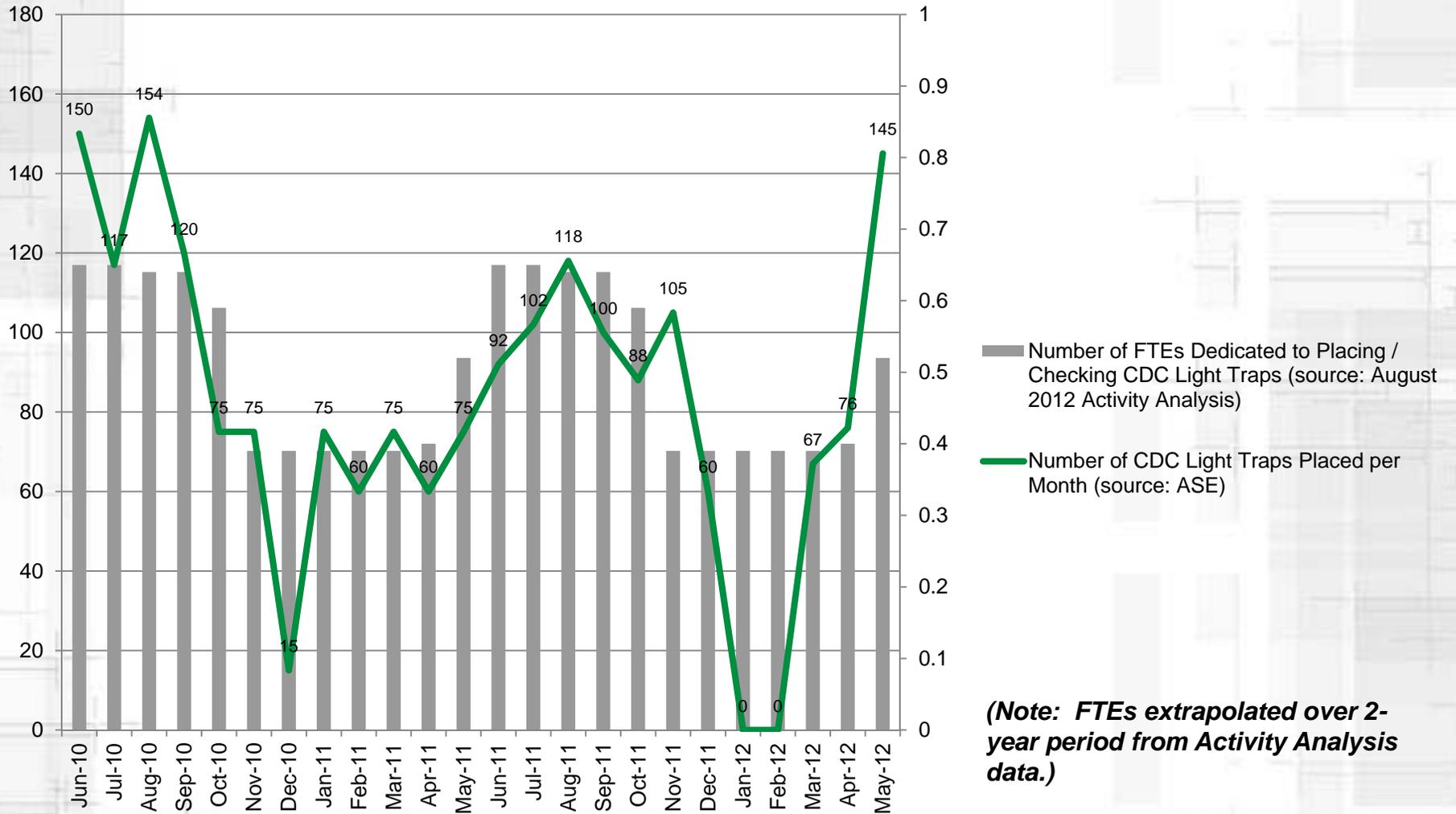
*landing counts performed at 35 designated sites around the county



(Note: FTEs extrapolated over 2-year period from Activity Analysis data.)

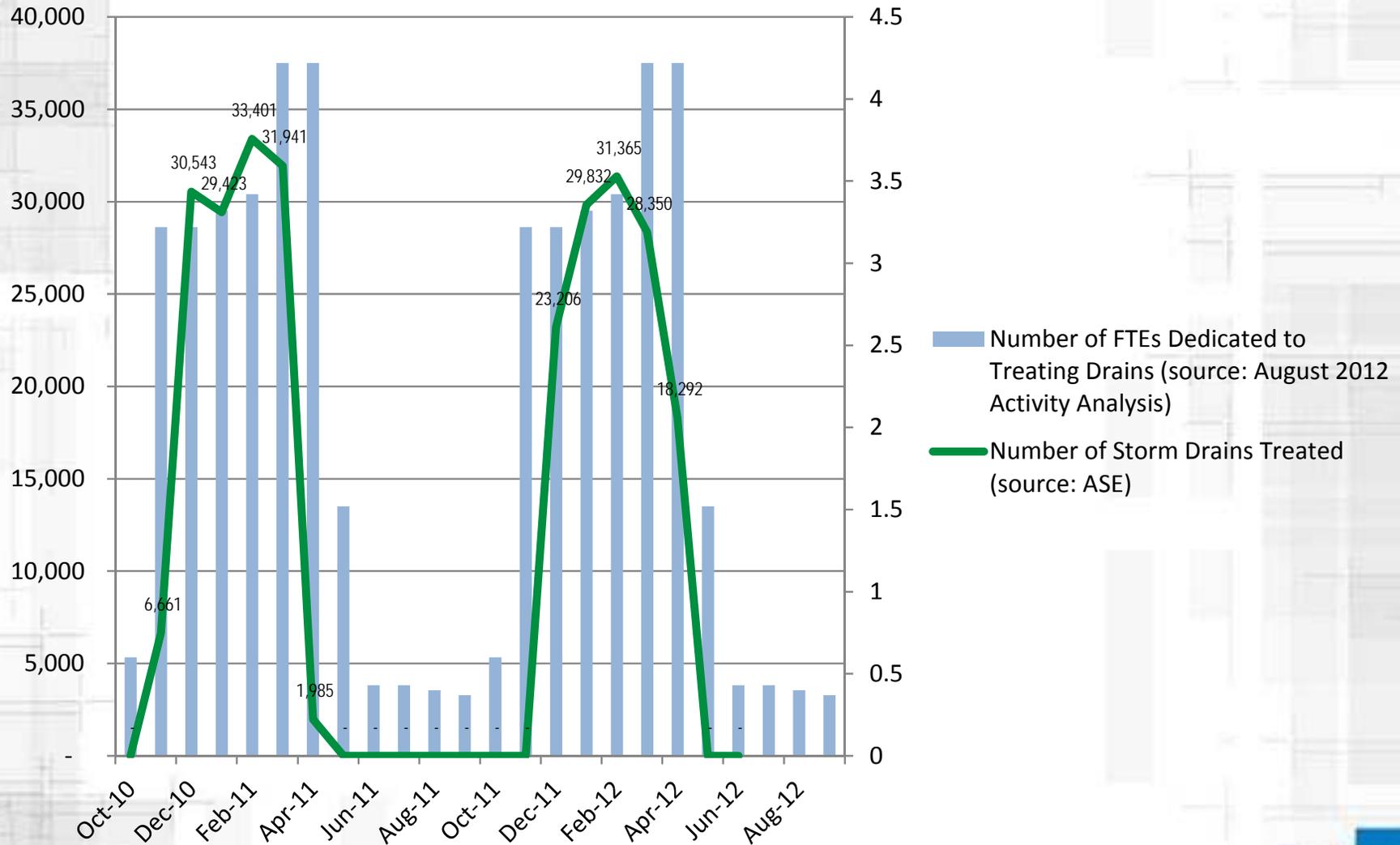
Number of FTEs Dedicated to Placing / Checking CDC Light Traps vs. Number of Light Traps Placed*, June 2010 - May 2012

*traps placed at 30 sites throughout the county



(Note: FTEs extrapolated over 2-year period from Activity Analysis data.)

Number of FTEs Dedicated to Treating Drains vs. Number of Drains Cleaned, October 2010 - September 2012



Key Findings: Activity Analysis

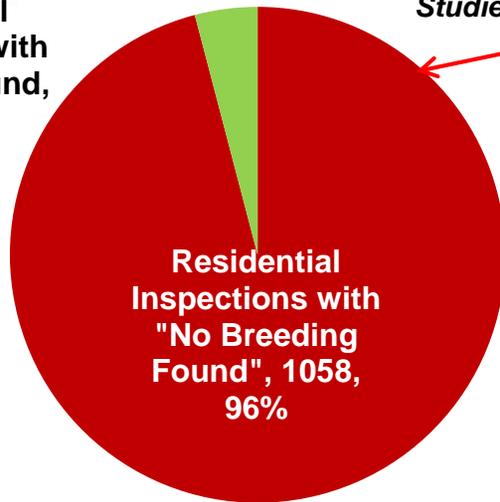
- In general, employees appeared to overestimate the amount of time spent on certain activities during drier months, when compared to workload data tracked in ASE. This was particularly notable in the case of inspections:
 - According to Activity Analysis data, there are approximately 4.6 FTEs dedicated to inspection of properties both during the wet and dry seasons; however, according to ASE data, inspection workloads are very low during the dry season.
- It appears that there may be some overlap in the areas of General Admin., Receiving Complaints, General Mgt. and Supervision, and chemical prep/storage/inventory between the Supervisor and Operations Manager.

FIELD INSPECTION RESULTS

(Based on 4 Sample Dates in May 2012)

Residential Inspections with "No Breeding Found" Results

Residential Inspections with Breeding Found, 45, 4%

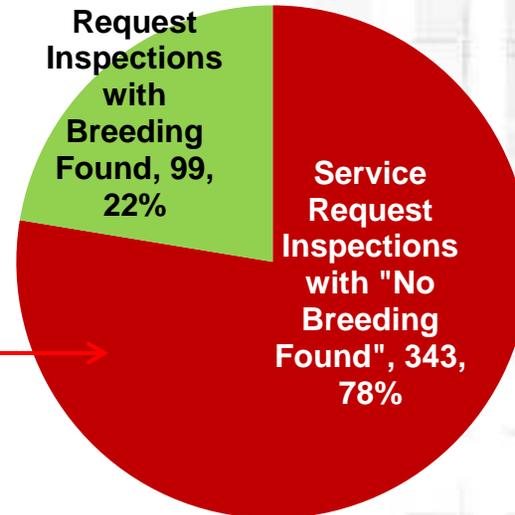


Total Residential Inspections Studied = 1103

No breeding found in 96% of **Residential** inspections

Service Request Inspections with "No Breeding Found" Results

Service Request Inspections with Breeding Found, 99, 22%



Total Service Request Inspections Studied = 442

No breeding found in 78% of **Service Request** inspections

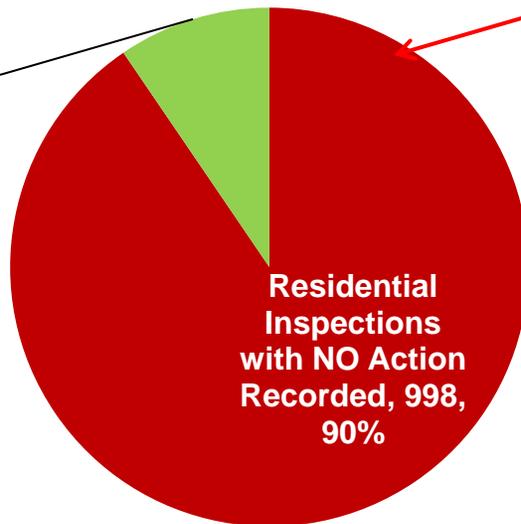
(Sampled dates: Tuesday, May 1; Wednesday, May 9; Thursday, May 17; and Friday, May 25, 2012)

FIELD INSPECTION RESULTS (Continued) (Based of 4 Sample Dates in May 2012)

"Action Taken" on Residential Inspections

Total Residential Inspections
Studied = 1,103

Residential
Inspections
with "Action
Taken", 105,
10%

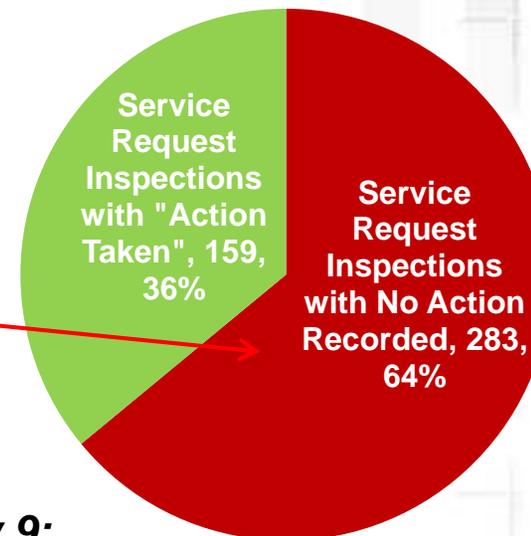


No action recorded on 90% of
Residential inspections

"Action Taken" on Service Request Inspections

Total Service Request
Inspections Studied = 442

Service
Request
Inspections
with "Action
Taken", 159,
36%



No action recorded on 64% of
Service Request inspections

(Sampled dates: Tuesday, May 1; Wednesday, May 9;
Thursday, May 17; and Friday, May 25, 2012)

Other Key Findings: Field Work

- A review of a sample of inspector Daily Work Report logs (*Exhibit B*) is consistent with ASE data regarding inspection work loads. This supports the previous finding that inspector perceptions of time spent on inspections during the dry season are overstated.
- PWWM does not call the resident prior to scheduling an inspection of his/her property. The Division's procedures describe a scenario where the inspector calls the office to obtain contact information when the complainant wishes to be called prior to the inspection, but it appears that nothing exists in the process that would support this scenario. If the resident is not home when the inspector arrives, the inspector is supposed to leave a note instructing the resident to call 311 again for further assistance.

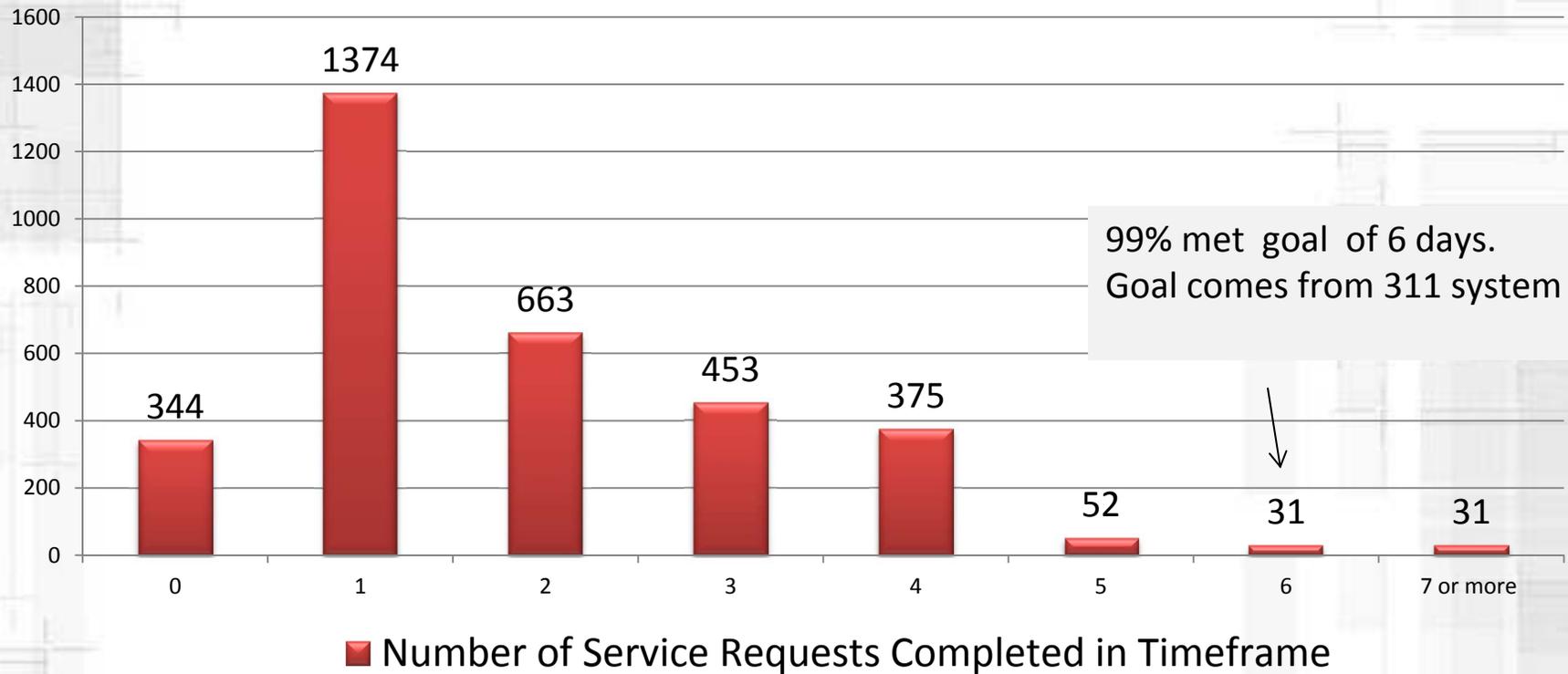
Other Key Findings: Field Work - cont.

- There appears to be some inconsistency in how inspectors access properties when property owners are not home. The formal procedures manual does not address a policy for accessing properties.
- There is no numeric system code (*Exhibit C*) to indicate whether the resident at the inspection location was home.
- There is no evidence that inspectors are consistently leaving a copy of the Inspection Report (*Exhibit D*) for the complainant; in some instances, complainants reported not having received the Inspection Report, although it may have been left.
- Neither 311 nor Mosquito Control specifically ask for permission to access property **prior to** inspector's visit.

Mosquito Issues: Frequency Distribution of Turnaround Time (calendar days) (3,323 total requests)

**August 2011- January 2012. Excludes 1 SR reported by Neat Teams.*

Source: CIAO



The target of 6 calendar days is not aggressive. The division's own procedures call for a turnaround of 1 to 2 working days for all service requests.

Key Findings: 311 Complaint Intake

- Based on a satisfaction survey sample of recent service requests (*Exhibit G*), customers are “satisfied” or “very satisfied” 80% of the time when they know an inspector visited the site. Conversely, they are “dissatisfied” or “very dissatisfied” 67% of the time when they don’t know whether an inspector visited the site.

Key Findings: Performance Data (ASE)

- Several mosquito control performance measures lack adequate descriptions. For example:
 - “CDC light traps” is defined as “Distribution of species in CDC traps, number of CDC trap nights. (one trap night = CDC trap placed out for one night of sampling).” However, staff indicated that this measure tracks the number of traps placed per month.
- Some performance measures appear to overlap (e.g. “breeding site inspections” and “number of sites inspected”); due to vague descriptions it is difficult to discern what measures represent.
- ASE data indicates a very large spike in the number of properties sprayed by truck in 2009. Staff explained this was because aerial spraying was not funded that year; however, ASE data shows aerial spraying in 2009 was similar to 2011.

Findings: Benchmarking Survey

Organizational Findings

- Mosquito control agencies from six different Florida jurisdictions, including Miami-Dade County, responded to the survey (*Exhibit E & F*). The agencies include three housed within county governments (Miami-Dade, Broward and Palm Beach counties) and three that are autonomous districts with their own millage (Lee, Monroe and Collier county districts).
- All jurisdictions indicated that they had a mix of geographic properties: urban, suburban and rural areas, coastal beaches, mangroves, and swamplands.
- Annual expenditures in the mosquito control districts with their own millage rate are much higher than the annual expenditures for the agencies housed within county governments, sometimes by a factor of 10.

Findings: Benchmarking Survey - cont.

Organizational Findings cont.

- Similarly, districts have larger staffs; the number of full time employees ranges from 13 in Palm Beach County to 77 in Lee County. Two jurisdictions (Lee and Monroe County districts) also employ a small number of seasonal workers.
- Mosquito control housed in county governments report to a public works official (Broward and Miami-Dade) or an environmental protection agency official (Palm Beach). Mosquito control officials in taxing districts report directly to a governing board.

Findings: Benchmarking Survey - cont.

Services and Activities

- Survey respondents use several criteria to determine whether truck or aerial spraying is required. Two jurisdictions specifically mentioned that landing rates in excess of 5 mosquitos per minute could justify truck spraying and more than 10 mosquitos per minute could justify aerial spraying.
- All jurisdictions use CDC light traps to calculate mosquito control populations. In addition, Collier County uses New Jersey light traps which they report are easier to maintain. New Jersey traps use electricity instead of batteries and CO₂ cylinders.
- The most frequent services provided by the responding jurisdictions in the wet season include: truck and aerial spraying, inspections of known breeding sites, responding to complaints, and setting CDC light traps.

Findings: Benchmarking Survey - cont.

Services and Activities cont.

- Three of the six jurisdictions (including Miami-Dade) indicated that all complaints result in an inspection of some sort. Lee and Collier County Mosquito Control do not always conduct inspections in response to individual mosquito complaints. Instead, resident complaints supplement other mosquito density information to help determine when and where to spray. In Palm Beach, site visits and inspections of residences are only conducted in the more populated areas of the county.
- During the dry season, surveyed jurisdictions reported several different activities: setting special surveillance traps, training activities, equipment maintenance (especially in districts with in-house aviation), updating maps, professional development and attendance at educational conferences, and checking traditional breeding sites. Palm Beach County reported that they clean storm drains (not necessarily treat). In Lee County, employees are only permitted to take vacation during this time.
- Among the jurisdictions surveyed, only two reported that they have services performed by an outside contractor (Miami-Dade and Palm Beach). In both cases, the service is for aerial spraying.

Findings: Benchmarking Survey - cont.

Public Information

- Two out of the three Mosquito Control Districts surveyed reported that they provide Comprehensive public education programs. Activities include: university partnerships and courses, booths at community events, programs at schools and summer camps, and significant outreach to local media. Of these, Lee County Mosquito Control District has a full time deputy director position dedicated to public education and provides education grants to a local university and school board. Lee County also utilizes college interns for educational activities.

Recommendations: Field Work

- When the complainant places his/her initial call, explore the feasibility of having the 311 call center ask the complainant for permission to access the property during the inspection.
- Develop a standard procedure for accessing the property when the property owner is not home at the time of the inspection.
- Develop a more effective standard procedure for notifying the complainant of the result(s) of the inspection (e.g., leave “mosquito trinkets”) *(should be coordinated with first recommendation on slide 32)*

Recommendations: Field Work - cont.

- PWWM should conduct roundtable discussions with Florida peers, including members of the Florida Mosquito Control Association, to explore innovative ideas and develop best practices for conducting fieldwork, especially in an environment of limited resources. These discussions should include, but not be restricted to:
 - Scheduling specific time windows for inspections
 - Most effective ways for conducting inspections during the dry season
 - Staggered work schedules and shifts to provide extended coverage (weekends and earlier/later times of day)
 - Efficient use of inspection resources during the dry season

Recommendations: Performance Data (ASE)

- Revisit objectives and measures on scorecards to ensure that:
 - Objectives support key departmental outcomes
 - Objectives and measures are relevant to Division's operations
 - Measures have true owners identified, clear descriptions, and sound data collection methodologies
 - Targets are aggressive yet obtainable, and consistent across different applications (311, ASE)

Recommendations: Service Requests

- Determine and develop an appropriate communication process for advising complainants of inspection results
 - Assess innovative techniques to inform complainant of inspection results *(should be coordinated with last recommendation on slide 29)*
- Evaluate the feasibility of allowing inspectors to record inspection results electronically and have information automatically populate PWS system and 311
 - Examine the use and availability of similar technology in other departments

Exhibits

- A. Activity Analysis Processes
- B. Sample Daily Work Report Log
- C. Public Works System Codes
- D. Inspection Report
- E. Benchmarking Survey
- F. Selected Comparative Data
- G. Customer Satisfaction Callbacks Survey

Mosquito Control

Preliminary list of Processes and Related Activities

Receive/Process Complaints:

- Receive complaints
- Respond to Commissioners' or Mayor's requests/directives
- Forward complaint information to operating work unit(s)
- Geo-Code complaints
- Close complaints

General Management and Supervision:

- Create routes/assign work
- Schedule work
- Review work
- Supervise employees
- Conduct employee performance evaluations

Field Work:

- Review work assignments/assemble materials
- Perform inspections of properties
- Treat premises
- Place/check traps at CDC sites
- Truck spraying
- Aerial spraying (contracted out)?
- Treat storm drains
- Perform landing counts
- Put chemicals/materials away (end of work day)

Lab/Facility Work:

- Analyze species found in traps
- Grow/nurture/manage fish
- Chemical preparation & storage
- Equipment maintenance

Administrative Work:

- Scientific reports/documentation (like DACS reports)
- Document field activities
- Answer miscellaneous phone calls
- Attend staff meetings
- Filing
- Budget work
- HR/Personnel work
- ASE work
- Prepare reports
- Prepare/process correspondence (e-mails, memos, letters, etc.)
- Education and outreach
- Process P.O.'s
- Conduct/attend training
- Other general administration

Miscellaneous Activity

PUBLIC WORKS SYSTEM CODES

Tasks	Code
Collect Fish	348
Aerial Mapping	319
Aerial Observations	301
Breeding Site Inspection	302
Building Maintenance	303
Courier	304
Court	305
Data Entry	306
Droplet test	344
Emergency Response	307
Equipment Maintenance	308
Equipment Repair	343
ER Assignment	309
General	310
General Mapping	318
Grounds Maintenance	311
Helicopter Maint.	312
Helicopter Repair	313
Inventory/Stock	314
Labwork (other)	342
Landing Rate	315
Larval ID	341
Leave	316
Load Chemical	317
Meeting	320
Proficiency Flight	321
Public Event	322
Quality Control	346
Reports	323
Research	324
Residential	325
Route Planning	326
Safety Equipment Maintenance	327
Service Request	328
Set/Retrieve Trap	329
Spray Flight	330
Storm Drain	331
Timesheets	332
Trail Clearing	339
Training	333
Trap ID	340
Travel	345
ULV Spray Route	336
Vehicle Maintenance	337
Waste Tire	338
Materials	Code
ABATE 5% PELLETS (LB)	310
ABATE SG-1 (LB)	120
Agnique MMF (GAL)	970
ALTOSID BRIQ XR (EA)	100
ALTOSID GRANULES (LB)	110
ALTOSID PELLETS (LB)	200
ALTOSID WSP (EA)	140
Altosid XR 150 ingot (EA)	130
Aqua-Anvil	990
AQUABAC 200 G	350
BACTIMOS-G (LB)	300
BAYTEX LIQUID CONC (GAL)	400
Bio-Mist 30+30 1/19 (GAL)	730
Bio-Mist 30+30 1/2 (GAL)	720
Bio-Mist 30-30 (GAL)	710
DIBROM (GAL)	500
DUET 1/6 (GAL)	735
Gambusia/Fish	112
MALATHION (GAL)	600
PERMANONE (GAL)	700
SCOURGE (GAL)	800
VECTOBAC 12-AS (GAL)	900
VECTOBAC-G (LB)	950
Vectofex WDG (LB)	980
VECTOLEX WSP (EA)	960
GOLDEN BEAR	899
NATULAR XRT	250

Actions	Code
Stock with Fish	436
Front Insp. Only	437
Adulticide	428
Advise Resident	401
Aerial Adulticide	402
Aerial Calibration	403
Aerial Larvicide	413
aerial training	429
Clean/Wash	404
Debris Removal	426
Dump	405
Educate	406
Fuel Chopper	407
Fuel Equip	408
Ground Calibration	409
Inspection	410
Issue Citation	411
Issue NOV	412
Larvicide	414
Maintain	415
Other	416
Presentation	417
Purchase Parts	418
Repair	419
Secure Facility	427
Smartflow Route	420
Supervise	422
Transfer Chopper	423
Transfer Vehicle	424
Unable to Inspect	425
LR taken	430
Remove	431
Install	432
Consult/Revise Manu	433
Assemble	434
Disassemble	435
Problems	Code
Adult	701
Aerial SR	702
Aerial Surveillance	703
Agency Assist	704
Breeding	705
Dry	706
Ground Service Requ	707
Hurricane	708
Inspector Check	713
Negative	709
Other Insect	710
Other Request	711
No Breeding Found	712
Pre-Flight	714
Post-Flight	715
Equipment	Code
Backpack Sprayer	2002
Boat	2010
Eurocopter A350	2015
FMC Sprayer	2009
Fork Lift	2008
Helicopter Hoppers	2012
Helicopter Sprayer	2011
Lawn equipment	2013
Misc. aerial equipmen	2014
P1 Sprayer	2003
Storm Drain Sprayer	2005
Thermal Fogger	2004
Tractor	2007
ULV Truck Sprayer	2006

Source	Code
Administrative	801
Annual	802
Art. Cont./small/Dumpable	803
Boat	804
Chemical	805
City Official	806
Commissioner	807
Contractor	855
County Office	808
DERM	809
Disease Control	810
Ditch	811
Downtown	812
Equipment	814
Files	815
Fountain	816
Ground Dep	817
GSA Shop	818
Homestead AFB	819
Hot Tub/Jacuzzi	859
Hurricane	820
Ice	855
Lake	821
Mangrove	822
Marsh	823
Mayor/City Mngr	824
MC Admin	825
MC Hangar	826
MC Trailer	827
MIA	828
Midge	829
North Office	830
NOV Court	831
Nursery Trench	832
Other	833
Other Co.	834
Other Property	838
Overtime	856
Parts	835
Perm. Art. Cont.	836
Pesticides	858
Pond	839
Pool	840
Port of Miami	841
R&B	842
RAAM	843
Service Station Tires	844
Sick	845
Smartflow	846
South Office	847
Sprayer	848
Storm Drain	849
Supplies	850
Tires	851
Tree Hole	852
Plant	837
Water & Sewer	853
Project	No.
Aerial Adulticiding	621550
Ground Adulticiding	621552
Residential Inspection	621554
Equipment Maintenance	621555
Mosquito Surveillance	621556
Administration	621557
Storm Drain Program	20050039
Service Requests	621554
Breeding Site Insp.	20070750
Waste Tire Inspection	621554

MIAMI-DADE COUNTY
PUBLIC WORKS DEPARTMENT
MOSQUITO CONTROL DIVISION

RECEIVED
MAY 02 2012

INSPECTION REPORT

8901 N.W. 58TH STREET
MIAMI, FLORIDA 33178
TELEPHONE: 3-1-1
FAX: 305-471-0520

Dear Resident at

1021 SW 92 Ave

(address)

An inspection was made on

5-1-12

(month/day/year)

in response to a complaint of

a mosquito nuisance in the area.

The results of our inspection are shown as marked below:

Mosquito breeding was found and eliminated in the following receptacles on your property.

bromeliad

storm drain

bird bath

flowerpot

bucket

trashcan

other Fountain

Adult mosquitoes were found and the yard was sprayed.

The containers listed are breeding mosquitoes and must be emptied to eliminate the mosquito nuisance.* _____

Mosquito breeding was found and eliminated at other residences in the area.

No mosquito breeding was found.

Your property could not be inspected. Please contact the Miami-Dade County Call Center at 3-1-1 if you have any questions.

*Section 26A-2.1(b) prohibits any person from allowing, creating, keeping or maintaining an artificially induced mosquito breeding area. Failure to abate such mosquito breeding may result in issuance of a citation.

SR# _____

INSPECTOR:

MOSQUITO CONTROL SURVEY - CONDUCTED BY MIAMI-DADE COUNTY

Miami-Dade County Public Works and Waste Management (Road and Bridge)	Broward County Public Works (Highway & Bridge Maintenance/Mosquito Control)	Lee County Mosquito / Hyacinth Control District	FL Keys Mosquito Control District (Monroe County)	Palm Beach County Department of Environmental Resources Management* *Interview conducted via phone.	Collier County Mosquito Control District* *Interview conducted via phone.	
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Basic Organizational Information

1) Population	2,496,435	1.8 million	625,000	75,000	1,320,134	321,520
2) Area (sq. mi.)	430 square miles	1,220 square miles	1,000 sq. mi. (98% of Lee County) (includes Lee, Sanibel-Captiva, Fort Myers and Boca Grande.) 1212 (803.60 land 408.40 water) Fl. Library website.	140 sq. miles	2386.50 (1974.20 land and 412.30 water)	400 sq. miles 2305.10 (2025.5 land, 279.60 water)
3) Does your jurisdiction encompass the entire geographic area of a county? (If NO, pls. explain)	Yes.	No.. Half of Broward County is Florida Everglades which is a protected habitat.	No. We cover 98% of Lee County. Ft. Myers Beach has its own special district.	No-Monroe County encompasses a very large portion of mainland FL and the FL Keys. The mainland portion consists primarily of Everglades National Park, and very few residents. Because of the lack of period in mainland Monroe County, the Florida Keys Mosquito Control District only serves the treats the Florida Keys portion of Monroe County.	Yes	No.
4) How would you describe your jurisdiction? (check all that apply)	Urban	Y	Y	Y	Y	Y
	Suburban		Y	Y	Y	Y
	Rural	Y	Y	Y	N	Y
	Coastal - Beach	Y	Y	Y	Y	Y
	Coastal - Mangrove	Y	Y	Y	Y	Y
	Swamp/Everglade	Y	Y	Y - SWAMP	Y	Y
	Other (pls. describe)				-	
5) Who handles Mosquito Control in your jurisdiction?	County Government	County Government	District	District	County Government	District
If Gov't: Dept. or Division?	Division	Division			Division	

MOSQUITO CONTROL SURVEY - CONDUCTED BY MIAMI-DADE COUNTY

		Miami-Dade County Public Works and Waste Management (Road and Bridge)	Broward County Public Works (Highway & Bridge Maintenance/Mosquito Control)	Lee County Mosquito / Hyacinth Control District	FL Keys Mosquito Control District (Monroe County)	Palm Beach County Department of Environmental Resources Management* *Interview conducted via phone.	Collier County Mosquito Control District* *Interview conducted via phone.	
6) Top Mosquito Control Official:		Manuel Garcia	Mr. Joseph Marhefka	Executive Director	Mr. Michael Doyle, Exec. Director.	Mr. Ed Bradford	Dr. Frank Van Essen	
Job Desc/Quals. Available?		Y	Y	Y	Y			
To Whom does he/she report:		Antonio Cotarelo, Interim County Engineer	the Director of Highway & Bridge Maint. Division (under the PW Dept.)`	Lee County Mosquito Control District Board of Commissioners	5 elected commissioners	The Director of Environmental Resource Mgt.		
7) FY 2011-12 Operating Budget		\$1,588,000 per FAMIS	\$1,117,710		\$11,824,729	\$1,959,606		
Actual Mosquito Control Operating Expenditures for:	2009	\$2,096,331	\$1,202,696	\$16,753,575	\$10,668,950			
	2010	\$1,813,864	\$1,142,280	\$16,092,492	\$10,766,454			
	2011	\$1,643,262	\$1,189,628	\$17,237,589	\$11,527,465			
If stand-alone District: Millage for FY12:		n/a	n/a	0.2388 mills	0.4836	n/a		
8) Unique Env./Geographic Attributes relevant in your jurisdiction?		Bordered on west by swamp wetlands (Everglades National Park, Biscayne national Park), and on the east by Biscayne Bay and small islands of mangroves.	We're bordered on the west by swamp wetlands (FL Everglades) and on the east by coastal beaches with mangrove wetlands.	Over 53,000 acres of salt marsh breeding habitat. It has an equally large number of fresh flood water areas. Much of the salt marsh area is managed by either the State of Florida or USFWS. By management agreements, these areas are restricted to larvae control of mosquitoes only. The emphasis on larviciding is very expensive and time sensitive. Repeat adulticide missions are required to treat for adults as they move from these restrictive lands to residential areas that are right next to the preserves.	Located completely within a protected marine sanctuary. There are also a number of state and federal protected lands located within the District which can make operational mosquito control rather challenging. We also experience large number of mosquito movements from the Everglades into the Upper Keys areas.	We border wildlife refuge.	Everglades National Park to the east bringing in lots of mosquitoes in the breeze into Naples area.	
9) In-house Personnel (Full-time, Part-time and seasonal) Available?	Is T.O.	19 full time, no part-time, no seasonal	15 - T.O. attached. (8 inspectors)	77 full time + 7 commissioners; 5 part time; 16 seasonal. TO is available.	69 FT, 1 PT, 31 hourly/on-call, and 2 seasonal.	13 full time (of which 7 are inspectors); 1 on-call, certified employee; no seasonal.	27 full time (5-6 are inspectors); 2 or 3 pilots part-time; No seasonal employees.	
10) Fleet	Tu	15	10	61	77	14	12	
	Planes	0	1	5	2	0	3	
	Helicopters	1	0	11	4	0	5	
	Other		2	36	11	0		

MOSQUITO CONTROL SURVEY - CONDUCTED BY MIAMI-DADE COUNTY

	Miami-Dade County Public Works and Waste Management (Road and Bridge)	Broward County Public Works (Highway & Bridge Maintenance/Mosquito Control)	Lee County Mosquito / Hyacinth Control District	FL Keys Mosquito Control District (Monroe County)	Palm Beach County Department of Environmental Resources Management* *Interview conducted via phone.	Collier County Mosquito Control District* *Interview conducted via phone.	
11) Mosquito Control functions performed by Contractor:	Emergency aerial spraying.	None.	None.	None.	Aerial spraying is contracted.	None.	

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Key Processes							
1) Types of Mosquitoes in Jurisdiction (Salt Marsh, Container, etc):	Salt Marsh, Container.	Salt Marsh, Container, Floodwater species.	Salt Marsh; Container; Other- fresh water flood.	Salt Marsh, Container.	Salt marsh; container; Floodwater	Salt Marsh; Container; Freshwater species.	
Focused effort on specific mosquito type? If YES, pls. describe.	Yes. Salt marsh mosquitoes are more aggressive in nature than container mosquitoes; therefore, our program is included to address the breeding locations of this species. When counts from the CDC light traps start rising we begin to address these areas by truck spraying. When this occurs the complaints from citizens normally are low therefore residential inspections for container mosquitoes are infrequent.	No.	Yes. Due to State and Federal restrictions on adulticide treatments and potential for migrating long distances, LCMCD must focus on larviciding the salt marsh areas first.	Yes. The majority of our efforts are focused on salt marsh mosquito control; however, due to the reemergence of dengue fever in 2009 and 2010, the District has increased its control of container-breeding mosquitoes, especially in the Key West area (approx. 10% of budget on Ea. aegypti).	Yes. For floodwater, we wait for emergence, usually treating 270,000 acres via aerial. For containers, we use the hand fog. For our coastal areas we larvicide.	No. We mostly do adulticide due to area restrictions, but some larvicide - in ditches.	
2) Activities Conducted?	Truck spraying; aerial spraying; inspections of known breeding sites; home inspections; treat homes for mosquitoes; set CDC light traps; treat storm drains.	Truck spraying; aerial spraying; inspections of known breeding sites; home inspections; treat homes for mosquitos; inspections of known breeding sites; set CDC light traps; <i>NOT: sentinel chickens nor treat storm drains.</i>	Truck spraying; aerial spraying; sentinel chickens; inspections of known breeding sites; home inspections; set CDC light traps; treat storm drains; other time trapping, BC sentinel traps (dengue testing); truck traps, susceptibility testing, RT_PCR, ELISA testing.	Truck spraying, home inspections, set CDC light traps, aerial spraying, treat homes for mosquitoes, treat storm drains, and test for presence of dengue virus in collected mosquitoes, set other traps specifically for container breeding mosquitoes (BG sentinel traps and oviposition cups and inspections of known breeding sites and treatment with larvicides by ground and air). NOT sentinel chickens.	Truck spraying; home inspections; set CDC light traps; aerial spraying; occasionally treat homes for mosquitoes; treat storm drains; sentinel chickens; inspections of known breeding sites; stock fish for retention ponds and neglected pools.	Truck spraying; set CDC light traps; aerial spraying; inspections of known breeding sites (ditches); and only occasionally treat storm drains. NOT sentinel chickens, home inspections nor treating homes. We also use New Jersey light traps (50) which are electrical and easier to maintain than the CDC light traps that require portable batteries and CO2 cylinders.	
Activities conducted by a Contractor:	Aerial spraying	None.	None.	None.	Aerial spraying.	None.	

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3) Describe How you respond to complaints (Who responds, how, time targets, average response time:	Our complaints normally come from residents who are annoyed by the presence of mosquitoes at their residence or workplace. Our inspectors visit each site and if someone is home, they inspect the location for possible breeding area and eliminate these conditions, do landing counts to see if adult mosquitoes are present, and if needed, spray the site. In addition, they leave with the complainant pamphlets and literature regarding prevention methods as part of our outreach program. Normally, we respond to complaints within 48 hours of receipt.	At times, staff varies due to complaints demand. On average, 4 inspectors respond to all spray requests. They perform a visual inspection and spray the area by truck. Projected response time is 3 days; average response time for FY12 is 3 days.	Complaints area taken during work hours by an employee. After work hours the District employs an answering service. This way we have a live operator 24 hours a day, 7 days a week to take mosquito complaint/service requests. Mosquito complaints are entered into a data base. We also have a website that allows services requests to be entered by the complainant and go directly into the data base. The service requests are geocoded and sent to the complain Inspector. the complaint inspector along with 2 seasonal employees will go to the service requests site(s) or an area representative of many service requests in neighborhood to do a landing rate count and site inspection for larvae. The findings are put in a smart phone and the information is sent in to a master data bases. The operations dept. will decide what actions to take based on that information. We try to respond within 24 - 48 hours. we do not measure or track response time. The district uses this information as supplemental data for determining where to treat. The primary methods are truck traps and CDC light traps. The volume of calls is too great to visit every service request/complaint call. This is not the main factor in where to spray.	Service requests can be called to the office or submitted via our online service form. If a request is received in the morning, it is given to the inspector directly after lunch to complete the same day. If a request comes in after lunch, it is given to the inspector to complete the following morning. our goal is to respond to all service request within 24 hours. Some service requests simply are requesting fish for pond, others ask for inspections of properties and/or fog trucks. If there is a mosquito complaint at the property, the inspector will do a land rat count in the area as well as walk the property and surrounding properties looking for the source of the mosquito issue. If adult mosquitoes are confirmed on property, the inspector may use a handheld fogger to treat the property, depending on mosquito species and abundance. Landing rate counts taken at homes are used for determining if a truck ULV treatment will occur that night, or an aerial adulticide treatment the following morning.	Complaints are logged in. Supervisor assigns it to an inspector. If in western part of county, we know we'll need aerial spraying, so we don't do site visits there. If in eastern part, we perform site inspection, landing rates, check adjacent properties, maybe hand fog. We would only adulticide (not larvicide). If problem is large, we would truck spray.	We do not always conduct inspections as a result of a complaint. We use surveillance in residential areas in known breeding areas, and with that information, treat as appropriate.	
4) If you conduct truck or aerial spraying in a residential community in response to complaints, please describe how you determine when spraying is necessary. Landing counts? Threshold prompting spraying:	The thresholds to prompt spraying are: Landing rates = 5 for truck spraying, 12 for aerial; CDC light traps = 15 for truck spraying, 30 for aerial.	We use CDC trap counts if they increase threefold from their baseline, plus landing rate counts are more than five (5) per minute, plus citizen complaints.	We use truck traps run daily, 7 days a week, May 1 - Oct. 31. We also use CDC light traps throughout the county weekly, all year long. Landing rates are only used for areas not covered by a truck trap or CDC light trap such as an island that can only be reached by boat or helicopter. Landing rates can also be used for areas that are not collecting enough mosquitoes through trapping due to the type of mosquito and other factors. Every truck trap and CDC light trap has a base line population based on years of surveillance. Mosquito Complain information is also utilized. Ground ULV Truck Treatment: Two times Truck Trap baseline Two times Landing Rate baseline Two times CDC Light Trap baseline. AERIAL TREATMENT: Three times Truck Trap baseline; three times Landing Rate baseline; Three times CDC Light Trap baseline	Spraying only done after verification of mosquito presence. The majority of our ground and aerial adulticide missions are decided by using landing rate counts. Thresholds vary throughout the Keys as well look for a threefold increase in our base population. The average for this threshold is 5 mosquitoes per minute. We use a higher threshold for aerial adulticide missions. The average threshold for aerial missions is 10 mosquitoes per minute. Also, we use CDC light trap information. Spraying is conducted in response to high collections, but thresholds vary depending on location of the trap. The District places about 50 CDC light traps every week throughout the Keys, and 260 landing rate stations checked approximately daily.	Because of protected area to the west, we know we would only aerial spray. We use CDC light trap baselines and complaints, landing rates and also disease criteria to determine if spraying is necessary.	We don't. We use our extensive surveillance programs to determine our spraying needs. These include landing counts as well as traps.	
5) Proactive Spraying at certain locations at regular intervals?	Y	Y	No, not legal.	No.	No.	No. (Spraying is based on surveillance results, nothing proactive.)	
Some aerial and truck spraying	n/a	N					

MOSQUITO CONTROL SURVEY - CONDUCTED BY MIAMI-DADE COUNTY

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If Yes:	Only some truck spraying?	Y	Y					
	Only some aerial spraying?	n/a	N					
Provide additional information to describe sprayings that are performed at regular intervals.	Truck spraying is performed in areas closest to the known breeding areas when CDC light trap counts start to increase.	Some businesses, schools and county parks.	Nothing is done on regular intervals. All work is based on scientific surveillance. Larvicide inspectors go to areas with rain, tide or known standing water. Adulticide treatment is only done based on the surveillance numbers meeting the criteria discussed earlier. It is not legal to schedule spraying without justification.					
6) What circumstances, if any, prevent you from spraying on occasions where you would otherwise have done so (weather-related or community-related):	Weather - wind and rain hinder operations.	People who have medical problems and are affected by the spray or people on the Florida Dept. of Agriculture and Consumer Services pesticide sensitive list.	Yes. We do not fly our helicopters in heavy rain, high or gusty winds or lightening. Trucks and planes are not used during rain and are dependent on the label of the material being used. The label will indicate weather parameters for treatment. You must follow the label of the material being used or risk a label violation which is federal law. For example, Masterline Kontrol 4-4, a ground adulticide, requires a wind of greater than 1 mph and no more than 10 mph or less. It all depends on the products we are using. We do not fly on July 4th or any other event that could be unsafe for aircraft or ground adulticiding. We do not adulticide in areas where people are gathering at night. For example, we treat schools the night before an event such as a football game -- if the numbers of mosquitoes warrant treatment. We do not treat on Halloween.	All adulticide missions, whether truck or aerial, are limited by maximum wind speeds as well as rainfall. No adulticide missions are conducted in the rain. Trucks will not be scheduled if winds exceed 12 mph. Aerial adulticide missions are not scheduled if winds exceed 15 mph. Aerial granular larvicide missions can be completed in higher winds and in light rainfall, as long as conditions are acceptable for the safety of the pilot. Aerial liquid parricide missions are limited to maximum wind speeds of 10pmh. The only circumstance that would prevent us from spraying, sans weather, is during truck missions. If people are outside, our drivers are instructed to turn off the machine until they have passed the people.				
7) Public Education Outreach Program?	Y	N	Yes	Yes				

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If Yes, pls. describe (what you do, who does it, key activities, annual cost?	Career day at schools, media advisory, health fairs, flyers and magnets - \$20,000.	Only upon request.	The District's public information program educates and informs the public about mosquito control and prevention methods. The program strives to raise awareness of mosquitoes and of vector-borne diseases. This is done through Florida Gulf Coast University environmental classes, Lee County School Board Environmental Education, community events throughout Lee Country such as Aviation Day at Page Field, Leadership tours of the District, Thomas Alva Edison Science Fair, and summer programs for camps, and printed and electronic information. The Department is responsible for distributing all District information. It produces the District updates to the media, a monthly District Newsletter and annual report. Information is provided to the media and the public through press releases and the District websites www.lcmcd.org and www.mosquitoed.com. LCMCD has a Deputy Director of Education and Communication (DDCE). Last year, the employee covered 41 media interviews and over 36 tours of the program or presentation to the public on LCMCD. The taking of service requests is also viewed as a public relations function. Service requests for 2011 were higher than average at 10,254 calls. Since 1986, the average number of service requests per year is 5,792. STAFF: we have a full time educational program with Florida Gulf Coast University - 1 Full Time Instructor and 10 Interns; and Lee County School Board - 2 Full Time Teachers at the District all of whom are completely funded by LCMCD grants, salaries and materials. Cost of 2 Teachers salary and classroom supplies is \$145,000. Cost of 1 Instructor and supplies at the university is \$116,025.	Individual inspectors do public education on a daily basis while in the field. In addition to this, the Biologist/Public Outreach Coordinator performs the majority of our more structured public outreach program. Activities include: preparing press releases and contacting people in the media who might print or broadcast pertinent information; arranging and conducting school programs including Science Days, Truck Days, Environmental Fairs and classroom teaching; representing the district at community fairs with an educational booth; presenting on behalf of the District at specific community luncheons and other education opportunities during civic meetings; prepare and writes proposals for new outreach projects; keeps the public informed about District activities; educates the public on new projects at the District that may have an effect on services; communicates and coordinate with other local agencies; answer phone calls from the media and the public about our activities. Total budget is \$40,000. This does not include the Biologist/Public Outreach Coordinator salary and benefits.			
8) Describe your key activities during NON-mosquito season: Does your jurisdiction have such a more intense period and a time of less activity? Pls. describe your key activities during the time of less activity.	June through October, dependent on weather pattern for the year. During the less active part of the year, staff continues to perform residential inspections as compliants arrive. In addition, they perform storm drain inspections and larviciding on approx. 100,000 catch basins throughout the County.	May - October. We survey neighborhoods and set special surveillance traps during less active periods.	May 1 - Oct. 31. The period of less mosquito activity is very full with vacation time - employees are not allowed vacation time May 15 - Oct. 1, with only limited exceptions that must be approved by the Exec. Director. This is also our training time, time to update maps, clear trails for inspection and conduct annual maintenance of equipment.	Winter months. We do many training exercises during the winter months: flight training for helicopter and airplane pilots, mosquito identification training, cross-training between inspector areas. We also attend and speak at both state and national-level conferences on mosquito control practices. The majority of our scheduled aircraft maintenance occurs during the winter months. Inspectors still conduct landing rate counts and larval inspections, but also perform trail maintenance and exploratory missions due to the cooler weather. Most years, we continue to have mosquito production during this time period due to our subtropical location. Therefore, we continue to both larvicide and adulticide when warranted.	June - early December. During slower months we check larvicide areas, create pass-through in vegetation (w/machete/chainsaws). We clean storm drains (about 100,000 a month). Equipment maintenance; some door-to-door public education.	May - late October, into November is most intense period.	

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9) How do you identify locations for CDC light traps and Landing Counts? Do you use same locations, or different locations?	Predetermined sites and are used for our CDC traps in order to calculate trends. Landing counts are performed at known breeding sites and at residential inspections to identify adult mosquitoes.	The Biologist picks the property locations. We use the same locations and move only as needed.	We have a number of set locations for CDC light traps. These locations have been determined based on historical information such as areas shown to have mosquito borne disease activity, high levels of vector mosquitoes and/or high mosquito populations. The District sets CDC light traps for special requests for treatment. for example, if someone is having an outdoor wedding they can request an adulticide treatment for that area. A trap will be placed at the site to determine if treatment is warranted. CDC light traps area also utilized when an area has mosquitoes, but they are not showing up in other surveillance methods or if an inspector cannot find adult mosquitoes and a complainant is persistent. The trap will give more definitive information over a greater period of time.	Landing rate stations were established decades ago in our District. Locations were chosen based on spatial separation as well as proximity to neighborhoods and known breeding sites. Locations were also established in problem areas to track changes in mosquito abundance. we continue to utilize all historical sites, but have also added new landing rate stations in areas we felt we needed more information. Sites are located off of the road in the first couple feet of vegetation. Light trap locations have been established since the late 1990s. We maintain all historical trap locations, but add additional traps in problem areas when necessary.	CDC light trap locations are representative of each geographic area of the county (currently 16 traps are set). Landing counts are complaint-based only. The traps stay consistent unless an area is developed, at which time the trap is moved.	Locations for our traps were predetermined some time back. We use RAMP test results to determine whether new traps should be added, as well as landing counts.	
10) What chemicals do you use for the control of mosquitoes. Your protocol with storage of chemicals? (Pls. provide copy of any formal policies/procedures if avail.)	Diabrom and Biomist. Storage of chemicals is based on EPA and state requirements.	Biomist 3-15 for ground spraying; Dibrom for aerial spraying; Abate and ALL for ground larviciding. The chemicals are stored at our facility in a sealed containment area. No formal policies.	Materials are selected much the same as a prescription would be selected. For larviciding, it depends on genus and species of mosquito, water temperature, age of larvae, water quality, whether the type of larvae are susceptible to the particular pesticide and type of area to be treated. for adulticiding, there are very few choices and ours depends on whether it is ground adulticiding or aerial adulticiding, the genus and species of mosquito to be treated, and if the mosquitoes in a given area are susceptible to a particular pesticide. (See list provided.)	Bacillus thuringiensis israelensis, Bacillus sphaericus, Temephos, methoprente, permethrin, naled, Malathion, mineral oil, chlorpyrifos, spinosad, dichlorvos. Chemicals are stored inside temperature controlled warehouses, when a locked yard, Warehouses are locked and can only be accessed by certain individuals. some materials are stored in inspectors' trucks as well. These are stored in lock boxes location in the truck bed, and trucks are stored within the locked yard.			

Data Collection

	Complaints Received	Y	Y	Y	Y	Y	Y
	Complaint Response Time		Y	N	N	Y	N
	Acres sprayed by truck	Y	Y	Y	Y	Y	Y
	Acres sprayed by aircraft	Y	Y	Y	Y	Y	Y

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1) Do you collect data on any of the following?	properties sprayed by trucks		N	Y	Y	Y	N	
	properties sprayed by aircraft		N	Y	Y	Y	N	
	# of CDC light traps set	Y	Y	Y	Y	Y	Y	
	Storm drains treated	Y	N	Y	Y	Y	N	
	Landing counts	Y	N	Y	Y	Y	Y	
	Inspections performed	Y	Y	Y	Y	Y	Y*	
	Other:			Rainfall, track all treatments	Mosquito species found; Resistance data; container type breeding; Containers treated; number of larvae/dip; Rainfall information.		* (Inspections are more proactive than reactive for us.)	
2) May we call you to Share Data?	Y	NO.	YES	Yes				

Selected Comparative Data

Jurisdiction/Year	Properties Sprayed		Acres Sprayed			Citizen Requests	Inspections (complaint driven)
	Ground	Aerial	Combined	Ground Spraying	Aerial Spraying		
Lee County 2009	N/A	N/A	-	448,839	860,032	N/A	N/A
Lee County 2010	N/A	N/A	-	414,626	1,056,779	N/A	N/A
Palm Beach County 2009	N/A	N/A	-	56,469	938,109	1,200*	5,000*
Palm Beach County 2010	N/A	N/A	-	34,097	806,400	1,200*	5,000*
Broward County 2011	N/A	N/A	-	375,080	131,670	11,975	49,203
Collier County 2009	N/A	N/A	1,296,333	-	-	517	N/A
Collier County 2010	N/A	N/A	1,545,246	-	-	256	N/A
Collier County 2011	N/A	N/A	2,640,534	-	-	997	N/A
Miami-Dade County 2009	431,298	635,189	N/A	N/A	N/A	10,582	14219
Miami-Dade County 2010	19,810	67,416	N/A	N/A	N/A	3,570	17621
Miami-Dade County 2011	N/A	464,894	N/A	N/A	N/A	12,425	21898
Miami-Dade County 2012	86,724 (through Aug)	373,700	N/A	N/A	N/A	8,523	18168

Notes:

* Palm Beach requests and inspections are estimates.

As of 11/8/2012

MOSQUITO CONTROL CALLBACKS - Customer Perception

Nineteen (19) complainants who reported a mosquito nuisance during the months of August and September 2012 were called back for this study and provided the following satisfaction feedback:

	Confirmed Visits (10)	Unconfirmed Visits (7)	Not Visited (2)
Satisfied/ Very Satisfied	8	0	0
Dissatisfied/Very Dissatisfied	1	4	2
Neither Satisfied nor Dissatisfied	0	1	0
No Satisfaction Opinion	1	2	0
Personal Contact	9	0	0
Received Written Material	7	0	0
Inspector walked the property	8	0	0
Inspector Sprayed/ Treated	7	0	0
Inspector took Preventive Measures	7	0	0