

2016 Annual Report



Collier Mosquito Control District



Collier Mosquito Control District

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Message from the Executive Director

Hello Everyone:

It has certainly been an eventful year here at the Collier Mosquito Control District. From my perspective, the year could be defined by some simple, yet potent terms, including: Zika, controversy, change, collaboration, discovery, and perseverance, among others.

As the third Executive Director at CMCD in as many years, it is my hope to carry on the traditions that have made the organization effective in the past, while providing steady leadership as we respond to and anticipate new challenges in the years to come. The organization as a whole owes a debt of gratitude to Dr. Tom Wilmot, who confidently led the District through a change in leadership and the hiring of an entirely new Research staff.

This past year also qualifies as a “season that never ended”. From the heavy mosquito season of 2015, local temperatures and rainfall both remained high throughout the winter months. Our last aerial mission of 2015 was the night before Christmas Eve, and we were back to a regular treatment schedule by February of 2016, thanks to a number of weather-related postponements during one of the wettest Januaries on record.

With the arrival of the Zika virus in Florida in early 2016, several aspects of our surveillance and control programs required immediate adjustment and augmentation. Our Inspectors and Research teams had precious little time to begin working on a new surveillance program for *Aedes aegypti* mosquitoes (the vector for Zika), along with discerning the best practices for its control. Our Mosquito-Borne Disease Response Plan was updated to address the unique nature of the *Aedes* mosquito, and the District’s helpful summer interns were tasked to determine its relative numbers and extent within the county. With the thoughtful approval of our Board of Commissioners, our Research Department was able to quickly acquire new equipment that would enable them to test for Zika (and other diseases) in-house, providing results in hours instead of days or weeks.

Further, representatives from the District began meeting regularly with the Leadership from the Department of Health. This collaboration led to the organization and implementation of additional surveillance, community outreach and education, as well as best practices for control.

The year will go into the history books as one with fewer than ten cases of Zika in Collier County, and no apparent local transmission of the disease. More importantly, when the heat and rains return next year, we will have the advantage of experience and a program already in place to help us better serve our citizenry.

As the world grows smaller, and more people visit the place we call home, it is our intent to continue to provide the valuable service of enhancing public health and making the District a pleasant place to live, work, and play.

On behalf of our Board of Commissioners and each employee, I thank you for your interest in the Collier Mosquito Control District. It is our hope that this annual report will inform, enlighten, and educate you. Please do not hesitate to contact us with any questions.

Respectfully at Your Service,



Patrick P. Linn, MS, MSHAPI, Executive Director
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Message from the Chair of the Board



John Johnson
Chair, Board of Commissioners

2016 Reflection: "It's all about the people..."

For the first time in my 16 years serving the people in Collier County as a Commissioner for CMCD, Mosquito Control became front page news, in Florida and across the country. The challenges of Zika containment coupled with public scrutiny of our scientific methods were at the forefront. As usual, the staff of Collier Mosquito Control rose up to this challenge and upheld the public trust by providing keen leadership, rapid response and proven safe & responsible solutions. We began the year with new leadership as Mr. Patrick Linn became our Executive Director. Tasked with challenges never before seen, Mr. Linn, Senior Management & Staff all came together utilizing responsible business principles, sound scientific method, continued analysis and comparison of empirical data, and specifically defined operational processes to insure the highest level of safety with minimal adverse impact on humans, wildlife, and the environment. My kids would say, "They crushed it!"

As my term of service to the District is coming to a close, I am so proud to have been associated with this organization and most importantly the people who give so much of themselves to fulfill their very important mission. For the citizens and visitors of Collier County please know that the special quality of life that we enjoy in Collier County is in a large part due to the tireless efforts of these Collier Mosquito Control professionals.

John F. Johnson
Chair
Board of Commissioners

Mission Statement

To provide valuable service to the community through suppression of both disease carrying and pestiferous mosquito populations in the safest, most economical manner, utilizing a variety of methods (Integrated Mosquito Management) in a manner consistent with the highest level of safety, and minimal adverse impact on humans, wildlife, the environment, and non-target organisms.

Vision Statement

Contributing to a healthy, high quality of life in southwest Florida and beyond by upholding public trust, applying sound science, utilizing best practices in mosquito control, economic responsibility, and an enduring search for solutions.



Board of Commissioners:
Robert Geroy, Michael Williams, Jacquelyn Thompson-Fresenius, David Farmer & John Johnson

Surveillance

In 2016, the Collier Mosquito Control District continued to expand the use of Centers for Disease Control (CDC) light traps for adult mosquito surveillance. The CMCD monitored 33 CDC light trap locations this year as well as 40 night landing rate count stations throughout the District. Significant trapping efforts were devoted to quantifying the efficacy of aerial treatments and, as a result, a new aerial treatment database was deployed at the end of 2016 to provide the District with more accurate assessments of those treatments. This database will allow the CMCD to compare treatment conditions across various missions in an effort to improve overall efficacy.



Biologist Mark Kartzinel and Inspector Butch May setting up a BG Sentinel Trap

The summer of 2016 also saw a dramatic expansion of the Collier Mosquito Control District's *Aedes aegypti* and *Aedes albopictus* surveillance efforts. Sixteen additional BG-Sentinel traps were purchased and deployed to track populations of container mosquitoes. The results of this trapping effort indicate that *Aedes aegypti* and *Aedes albopictus* mosquitoes are ubiquitous throughout the District. Over the course of the summer, 20 suspected/imported cases of the Zika virus were intensively investigated.



Biologist Mark Kartzinel

By the end of the fiscal year, over 1.2 million mosquitoes had been trapped and counted and over 22 species were identified. The District also deployed Gravid traps to support and test for the presence of West Nile Virus in *Culex* species mosquitoes.

During the year, the CMCD investigated the use of timed CDC traps and Gravid *Aedes* Traps (GAT), which are used for container mosquito surveillance.

A timed CDC trap could provide an advantage to the District by allowing a trap to be set in advance and become active at a predetermined time. For example, setting a timed CDC on Friday for a Monday morning collection will provide surveillance data earlier in the week and improve staff response to mosquito complaints. GAT traps are specifically designed to capture gravid *Aedes aegypti* mosquitoes. Both traps proved to be successful in the field and will be integrated into the District's surveillance regimen during the 2017 season.

Larval Control



CMCD personnel larviciding a ditch via a truck outfitted with a 400 gallon larviciding unit

With the emergence of the Zika virus, larval control became a top priority for the Collier Mosquito Control District in 2016. Aerial larval control missions were conducted on over 1,111 acres during FY 2015-2016, utilizing AquaBac XT for a majority of the treatments. MetaLarv S-PT, Altosid XR and Natular were also utilized. The District also began testing a new water-dispersible BTi based larvicide called VectoBac WDG, which can be applied either aerially or via ground-based equipment. Additionally, the District invested in two new dispersal systems to use this material; a Buffalo Turbine Mister/Sprayer for ground treatments and a Simplex Larvicide System with aerial capabilities. MetaLarv-SPT was also tested as a control agent against *Mansonia* larvae with good results. Finally, the District began using Natular DT, a tablet-based larvicide designed for use where container mosquitoes breed. Each of these materials will see more widespread use in 2017.

Adult Control

FY 2015-2016 was a very busy year for adulticide treatments. A record-breaking El Niño weather pattern brought mild, wet weather to southwest Florida throughout the fall and winter. In January alone, southwest Florida received more than six times the average amount of rain and shattered all records kept by the Southwest Florida Water Management District since 1915. The months of February, March and April remained wetter than average with rainfall amounts



Patrick Linn and John Appezzato discuss aerial treatment plans for the upcoming evening.

two to three times above normal precipitation levels. Due to the abundant rainfall, the persistent freshwater mosquito season never truly subsided from the previous year. The salt marsh mosquito season was also very active. In June and again in September, tropical storms passed close enough to Collier County to generate minor storm surge that flooded mangrove larval sites, creating abundant broods requiring control.

The combination of the rainy winter coupled with a few brushes with tropical weather made for a very active - and lengthy - mosquito season. The District conducted a total of 157 fixed wing and 38 helicopter missions from February until October treating 3,587,031 acres. By October, many locations in Collier County had begun to dry out and a more typical pattern of wet-season and dry-season is expected in the coming months.



The District's aerial larviciding crew



Inspector Butch May testing the larvicide Methoprene in the field via a backpack sprayer



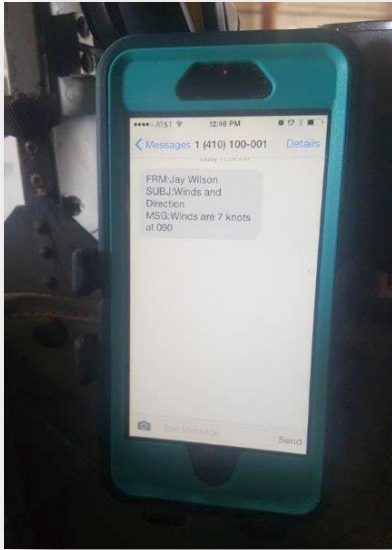
Larvicide granules

Flight Operations

Communications

During the 2015-2016 fiscal year, improvements in communication between flight and ground crews were implemented, providing text message capabilities for the transmission of information regarding changes in wind direction and speed at treatment altitude. This information is obtained from the District's weather sensors (mounted on towers across the

District) and transmitted to a computer in the hangar. If a shift in wind direction and/or speed are noted, that information is then forwarded to the flight crew via text message, aiding in a more precise treatment of the target area.



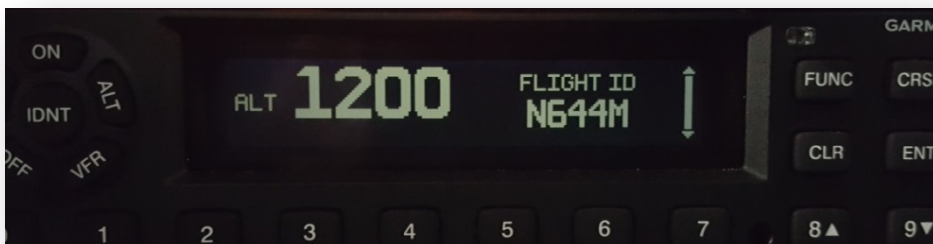
Example of a flight to ground communications message

Automatic Dependent Surveillance-Broadcast (ADS-B) equipment, also termed *NextGen*, has been installed in all District aircraft, well in advance of the FAA mandatory date of January 1, 2020. ADS-B is “America’s air traffic control system of the future”. It provides flight, weather, and radar data to properly equipped aircraft and the nation’s Air Traffic Control system. The ADS-B also utilizes Bluetooth technology to transmit display maps, information on other aircraft and weather wirelessly to an iPad or other tablet-style device.

Nationwide, this technology is anticipated to make flying safer, more efficient, and “greener”. Installation of the equipment into District aircraft was performed by Naples Jet Center throughout the 2015-2016 budget year.



ADS-B Bluetooth capabilities include both iOS and Android tablet applications



One of the new ADS-B transceivers which have been installed in all of the District's aircraft.

Aircraft Maintenance

Preventive Maintenance



Aviation Assistant Jon Morris performing corrosion work on one of the District's Skyvans

Corrosion control is an ongoing function, accomplished by the maintenance staff. Standard protocol for involves three broad aspects: Identification; treatment; and re-painting. Identification of corroded components is the first and most important aspect of corrosion control. Various forms of treatment follow, bringing the affected component back to specification. The process culminates in final painting and return to service.

Helicopter Equipment Enhancements

Due to the need for the District to control *Aedes aegypti* mosquitoes in areas suspected to contain the Zika virus, the District has added versatility to its wet larviciding program through the purchase of a Simplex Model 8500 Spray System. This new dispersal system will give the District alternatives with respect to the type of materials available for application, including VectoBac WDG, a BTi material.



Aircraft mechanics Greg Schiegner and Peter Brake perform maintenance on one of the District's five helicopters



Isolair pods including the new rotary applicators

The District has also installed Isolair rotary applicators to aid in precision application of dry larvicide material.

Bees

A central component to a comprehensive mosquito control program involves minimizing risks to non-target organisms from mosquito control treatments. Domestic bees are an economically vital part of agriculture in South Florida and can potentially be exposed to control materials from District operations. In order to understand any potential impacts mosquito control may have on domestic bees, the CMCD has partnered with a local bee keeper and installed two research beehives at District headquarters, located behind the Naples airport. The hives are monitored daily for disease and hive pests as well as any impact from mosquito control treatments. To date, the hives have adjusted nicely to their new surroundings and have begun foraging into the surrounding mangroves of the Gordon River Greenway. It is planned that these research hives will be monitored over the long term and will become an integral part of the District's research program in the coming years.



District Biologist Mark Kartzinel tends to the bee-hives located at District headquarters



District Biologist Mark Kartzinel identifying mosquito larvae from field surveillance

New Disease Surveillance Equipment

The spread of the Zika virus across South America and into Florida has reminded us all that our global interconnectedness can bring new pathogens to our state and the District very quickly. In 2016, Florida saw cases of imported Malaria, Dengue fever and Chikungunya as well as local transmission of West Nile Virus, Dengue fever and a widespread outbreak of the Zika virus in Miami-Dade County. Scientists predict that the emergence of new pathogens and

reemergence of previously contained pathogens

will continue as global connections increase. Because of our subtropical climate and prominence as a tourist destination, South Florida remains particularly vulnerable to the importation of mosquito-borne illnesses.

To combat the threat posed by the Zika virus and future emerging pathogens, the CMCD invested in significant laboratory upgrades to enable in-house detection of any vector-borne diseases. The laboratory upgrades consist of: a biosafety cabinet for the safe handling of

potentially infected materials, a nucleic acid extractor to separate the genetic material of a pathogen from other components, and finally a Quantitative Reverse-Transcriptase Polymerase Chain Reaction (QRT-PCR) machine, which will amplify and detect

the genetic material of any pathogen. With the power of this new equipment in our laboratory, CMCD gained the ability to safely process and test over 400 pools of mosquitoes for the Zika virus, Chikungunya, Dengue fever and West Nile Virus in 2016.



District Entomologist Dr. Mark Clifton begins the processing of testing mosquitoes for diseases

Understanding where pathogens are found in mosquito populations is an integral component to effective mosquito control. In many cases, mosquitoes infected with a pathogen will exist well before an outbreak becomes widespread. Testing mosquitoes for pathogens in-house will help the CMCD

to detect and interrupt disease transmission earlier and focus our resources on the highest risk areas. The investment in this equipment ensures that we will be ready to respond to any threats posed by the Zika virus as well as any future threats that may arise.

***Mansonia* spp. Study**

During the summer of 2016, the CMCD initiated a research project aimed at understanding the source of *Mansonia titillans* and *Mansonia dyari* mosquitoes, which have become increasingly common in eastern portions of Collier County. *Mansonia* spp. mosquitoes are a unique genus of mosquito that - during their larval stage - do not breathe from the surface of the water, but rather tap into the roots of certain aquatic plants to obtain oxygen. Because of this behavior, *Mansonia* spp. are able to inhabit permanent bodies of water that contain their preferred host plants, water hyacinth (*Eichhornia crassipes*) or water lettuce (*Pistia stratiotes*) and pose a very challenging mosquito control problem.



Mansonia mosquito larva breathing air under water from a water lettuce root

Through the study, permanent bodies of water that contain aquatic weeds were identified by helicopter and specialized emergence traps were constructed to catch mosquitoes as they transitioned to adulthood. The results from this study demonstrated that even a relatively small body of water, when covered with aquatic weeds, can be an extremely productive habitat for mosquitoes. Our emergence traps regularly caught *Mansonia* spp. mosquitoes, but it was also determined that dense patches of aquatic weeds created a secondary habitat for *Anopheles* spp.

and *Culex* spp. mosquitoes as well. Our results also demonstrated that on average, half of a million mosquitoes emerged each day from a 40 acre borrow pond.

In the eastern part of Collier County, new larval control measures were tested on our study site. MetaLarv S-PT was dispersed by helicopter and the production of mosquitoes was monitored over a one month period. MetaLarv S-PT contains a mosquito endocrine disrupter which prevents the emergence of adult mosquitoes, and the initial results appear promising. The number of mosquitoes produced per square meter was reduced by 60%. However, to the north of the study site lies Baucom Cypress Strand, a productive habitat of over 400 acres. Serving as part of the drainage system of Lake Trafford, Baucom Cypress Strand has become densely packed with both water hyacinth and water lettuce. The size and dense cypress canopy

of this swamp makes for a challenging habitat to control mosquitoes. Alternative control measures such as aquatic weed removal or drainage improvements are currently under investigation.

Aedes aegypti and *Aedes albopictus* Survey

From May until August of 2016, it was a common occurrence to see Collier Mosquito Control scientists and interns in every corner of the District setting specialized mosquito traps for *Aedes aegypti* and *Aedes albopictus*

mosquitoes. These two species of mosquitoes lay

eggs in discarded containers and can be frequently found around homes, schools and neighborhoods where they prefer to feed on the blood of humans. Unfortunately, they are also capable of transmitting the Zika virus, Dengue Fever and Chikungunya. To understand where in Collier County these mosquitoes are found, the Collier Mosquito Control District conducted a county-wide survey that involved two very specialized surveillance tools: The ovicup and the BG trap.

The ovicup is a simple black cup filled with water and ringed inside with a piece of textured paper. When placed

in a dark, hidden area, *Aedes* spp. mosquitoes find this container irresistible for laying eggs. By examining the eggs laid in an ovicup after a week, the presence or absence of these species can be ascertained in any given neighborhood. Our research team and two summer interns spent a portion of nearly every day collecting and distributing ovicups around the county. Over 530 locations were sampled and 63% of these locations contained mosquito eggs from *Aedes aegypti* or *Aedes albopictus* mosquitoes. The BG trap is another specialized trap that uses a human-



District Biologist Mark Kartzin checking an ovicup for mosquito eggs



Mosquito eggs on textured paper after being submerged in water in an ovicup

scented lure and carbon dioxide to attract *Aedes spp.* mosquitoes into the trap. One-hundred-ninety-eight locations were sampled using a BG trap and 76% of these locations contained either *Aedes aegypti* or *Aedes albopictus* mosquitoes.

What we learned from this study was that the *Aedes spp.* species can be found nearly everywhere in the District. Some locations saw 100 or more mosquitoes trapped in a 24 hour period, indicating a very high population of mosquitoes capable of sustaining disease transmission. The results from this survey will allow the CMCD to better target public education campaigns, treatments, and most importantly understand the risk posed by these mosquitoes. In response to the results of this study, the CMCD invested in new aerial and ground-based larviciding equipment to meet the specialized challenges posed by *Aedes aegypti* and *Aedes albopictus* mosquitoes.

The eggs and data collected from these studies were also sent to scientists at the Florida Medical Entomology Laboratory (FMEL) for insecticide resistance testing and for inclusion into a statewide database to map the distribution of *Aedes aegypti* mosquitoes in Florida. Preliminary results indicate that resistance to pyrethroid insecticides is common in some populations of *Aedes aegypti*. At both the District and state level, 2016 was a year spent assessing the threat posed by *Aedes aegypti* mosquitoes to public health. What we learned is that South Florida and Collier County are vulnerable to mosquito-borne disease and that much work needs to be done to control mosquito habitats around homes and businesses within the District.



District intern Rachel Bales placing an ovicup at one of the numerous surveillance sites throughout Collier County



Rear view of the truck mounted Buffalo Turbine Mister/Sprayer



Hydraulic nozzles on the Buffalo Turbine Mister/Sprayer

Buffalo Turbine Mister/Sprayer

During the summer of 2016, the CMCD conducted a county-wide survey of container breeding mosquitoes. The results of this study and the threat posed by the Zika virus have indicated that the ability to control populations of *Aedes aegypti* and *Aedes albopictus* mosquitoes will be vital for protecting public health in the future. Container breeding

mosquitoes require specialized control strategies due to the widely distributed and hidden egg-laying sites they will use. Controlling adult populations alone is generally not adequate to disrupt disease transmission, as new mosquitoes are continually being produced from water-bearing containers. To effectively control *Aedes aegypti* mosquitoes, larvicides must be used in conjunction with adulticides.

In August of 2016, the CMCD purchased a Buffalo Turbine Mister/Sprayer. This unique piece of equipment uses a gasoline motor to power a large turbine-style fan. Larvicide control material, such as BTi (BTi consists of the bacterium *Bacillus thuringiensis israelensis*), is injected into the airstream and is sent, as a mist, high into the air. Small droplets of BTi will float to the ground landing in any hidden containers of water that may contain larval mosquitoes. In September, field scientists from Valent Biosciences visited the CMCD and worked with our research team over three days to set up and evaluate the Buffalo Turbine Mister/Sprayer at the Naples airport. By modifying and rearranging the hydraulic nozzles, this system was able to create 170 micron droplets that were demonstrated to travel up to 500 feet in the wind. The CMCD is one of the first Districts in South Florida to employ the use of a Buffalo Turbine Mister/Sprayer to control larval *Aedes aegypti* mosquitoes.

A major impediment to the successful control of *Aedes aegypti* mosquitoes in many places in the world is the difficulty in accessing the hidden places where they lay eggs. The Buffalo Turbine Mister/Sprayer is a very powerful and unique tool that is used to disperse Bti larvicides in areas

where *Aedes aegypti* may breed. In conjunction with aerial adulticiding, the CMCD is well-positioned to be able to control *Aedes aegypti* mosquitoes at any stage of their life cycle to disrupt disease transmission and protect public health. Research into the full capabilities of the Buffalo Turbine Mister/Sprayer is ongoing but will likely include further refinements to the droplet and spray characteristics as well as allow for operational trials with granular larvicide materials.



Another view of the Buffalo Turbine Mister/Sprayer

Community Relations

While the Collier Mosquito Control District has remained dedicated to developing public trust, 2016 brought several new challenges to address.



Dr. Tom Wilmot educates employees from the Health Department of Collier County about the ovicup project.

In February 2016, the Olympic Games brought an increased awareness and risk of the spread of the Zika virus throughout Florida. In response, the District developed a targeted Zika prevention program that involves more intense monitoring and testing in areas where there is a suspected case of Zika. The District worked closely with the Florida Department of Health on a tiered response plan that included the education of County employees should local transmission occur.

During this time, we worked to improve our treatment notification systems through the CMCD website, social media, text-messaging, autodialing and the launch of the smart-phone app on both iPhone and Android platforms.

As the threat of the Zika virus grew, the District began to receive more phone calls, complaints, and negative feedback via social media outlets. The emerging crisis reached critical mass as the hot, humid weather bred more and more *Aedes* mosquitoes and the national media coverage of Zika in the state of Florida bred heightened fear amongst residents and visitors.

Local media coverage was reaching a tipping point with daily calls from all local television news stations and the *Naples Daily News*. While a few reporters took time to learn about the treatment protocols, others were fueling the local fire with sensationalized misinformation. Additionally, environmental groups began to actively protest the use of Dibrom/Naled, our primary control material.

The District contracted C2 Communications, owned by Cyndee Woolley, as a public relations consultant to assist in its response to the barrage of phone calls, complaints and inaccurate media reports. Woolley's first task was to develop a *clear and accurate message* regarding the District's Zika monitoring program in conjunction with its established treatment protocols.



Executive Director Patrick Linn being interviewed by Risa Morris with NBC-2 News

Woolley took over the management of the District's Facebook page, which was under assault from environmental protestors that were spreading inaccurate information. She coordinated with the District's Research Department to ensure accurate and timely responses to misinformation about Dibrom/Naled. Additionally, she coordinated with the Florida Department of Health and the Collier County Sheriff's Office to address false accusations of medical concerns and threats against District aircraft.

With Zika making national headlines, the District met with Governor Scott along with State and County leaders at a Zika Roundtable Discussion.

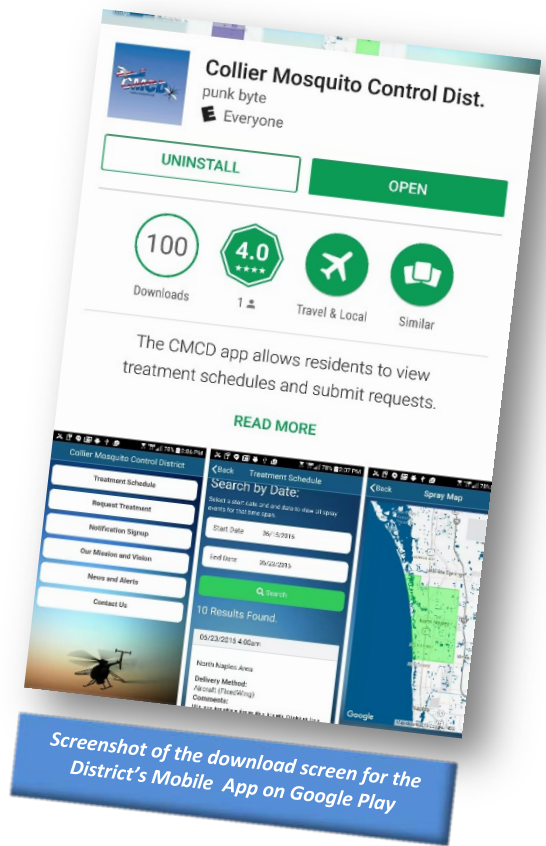
The District was also pleased to welcome Congressman Mario Diaz-Balart for a tour of the District's operations, as well as a frank discussion about funding for mosquito control. C2 Communications coordinated with the Congressman's staff to cross-promote the District's mobile application and notification systems. The Congressman applauded the District, saying that it was the most advanced notification system he had seen in the state.



Executive Director Patrick Linn and Cyndee Woolley with C2 Communications participate in Governor Scott's Zika Roundtable Discussion



Executive Director Patrick Linn gives Congressman Mario Diaz-Balart a tour of District headquarters



Screenshot of the download screen for the District's Mobile App on Google Play

Once the District had a stronger hold on messaging, C2 Communications assisted the District by hosting a local roundtable of leadership from community partners. This local roundtable included Collier County Government, Collier County Sheriff's Office, Collier County Tourism Department, City of Naples, City of Marco Island, local first responders, and public information officers.

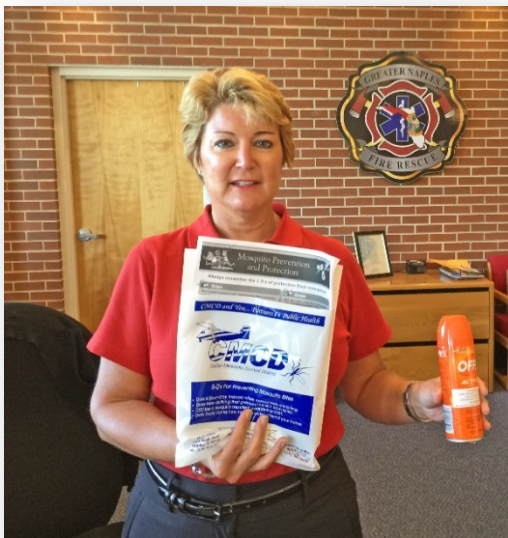


Roundtable meeting of local community partners at CMCD

This local roundtable discussion had multiple goals:

- Educate Key Partners about Preparation/Operations
- Coordinate Communications to Reduce Public Misinformation
- Build Long-term Trust for Ongoing Zika Threats

The meeting was very well received among the attendees and has opened doors for more collaboration. In the spring of 2017, Collier Mosquito Control District will be making presentations to the Collier County Board of Commissioners, City of Naples and the City of Marco Island. Additional efforts have been made to partner with the Collier County School Board, Naples Area Board of Realtors, and the Leadership Collier Foundation. The Board can also look forward to the District sharing a collaborative educational video produced and released in partnership with the Florida Department of Health. These ongoing efforts are designed to educate the public about their ability to exert a positive impact, the science behind mosquito control efforts, and safety protocols that the District utilizes.



CMCD distributed Zika prevention kits to first responders such as the Greater Naples Fire Rescue

In an effort to engage the public, the District has distributed mosquito repellent wipes to local hotels and Zika prevention kits to first responders. The District is also in the process of acquiring Natular DT tablets to be used as a larvicide that can be passed out locally. While the District recognizes the efficacy of our current control methods and materials, we are exploring ways to engage more citizens in mosquito awareness and control through alternative methods. The District is also seeking to develop a program to dispense mosquito fish (gambusia) as a natural larvicide. Looking ahead, our education and outreach programs also seek to take advantage of the beehive as a training tool for novice beekeepers and possibly science experiments for local children.

With assistance from C2 Communications, the District has been more proactive in its media outreach. The District invited multiple outlets to join our pilots on a mission to see “behind the scenes” at mosquito control. Dr. Mark Clifton and Cyndee Woolley collaborated on guest

commentaries that were developed specifically to address two concerns in local media – the myths and facts of Dibrom as well as why Collier County’s unique environment contributes to our overwhelming mosquito population. Looking into 2017, the District anticipates incorporating monthly guest commentaries updating the public about mosquitoes, the Zika virus, and any new mosquito-related potential health threat to the area.



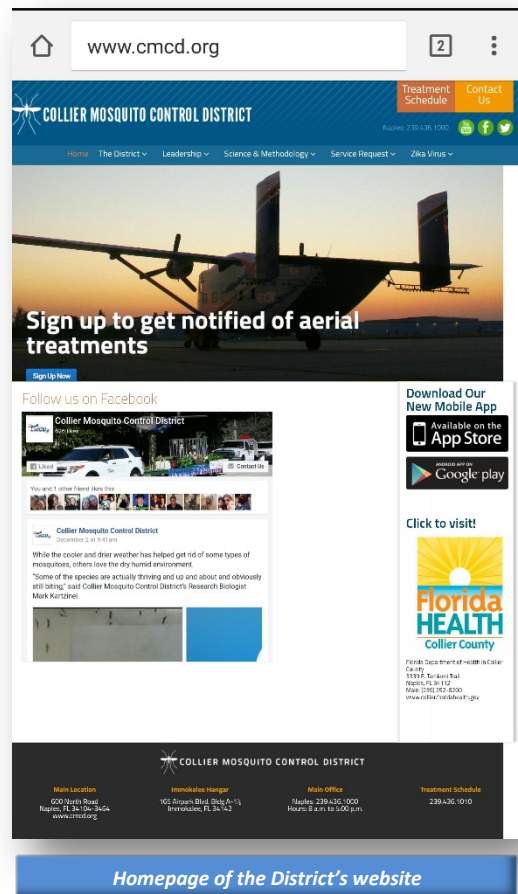
Dr. Mark Clifton speaks to the media about the annual Immokalee Tire Drive

effort to streamline and ease access to available information. Over the next year, there are plans in place to improve the function of our database and notification program. Also, watch for further redesign of the website’s look and feel.

In response to citizen feedback, the District has also made improvements to both the website and the mobile application by adding a “notify all” feature. This now allows residents to be notified off all aerial treatments; not just the ones scheduled for their residence. Patrick Linn and Cyndee Woolley are working with the Superintendent of Schools on a plan to promote this notification system to all after-school sports programs so that they can be aware of treatments. We have also adjusted our service request form to protect the identities of law enforcement officers and protected first responders.

The Zika virus has increased public awareness of the District’s operations. In the interest of transparency and being a strong partner in the community, the District is actively seeking to fill the position of a full time Public Relations Specialist to continue to build upon this year’s communication efforts.

The District’s website www.CMCD.org remains a cornerstone of information for residents and visitors. C2 Communications was instrumental in cleaning up our website in an



Homepage of the District’s website

Personnel

Nate Phillips, Mark Prince, Freddie Williams, and John Appezzato were recognized for five, ten, fifteen, and thirty years of service respectively at the January, 2016 Tenure Awards luncheon.



Nate Phillips (5 yrs.), Freddie Williams (15 yrs.), John Appezzato (30 yrs.) and Mark Prince (10 yrs).



Dr. Mark Clifton, Research Entomologist

During fiscal year 2015-2016, the following personnel were hired: Mark Clifton, Ph.D., Research Entomologist, Mark Kartzinel, Biologist, Kevin Dunleavy, Pilot, Rachel Bales, Part-Time Intern, and Padhraic McGlynn, Part-time Pilot. Megan Buddenhagen, a Seasonal Inspector, was also hired for a four-month period during the summer, to assist our research personnel.

Dr. Thomas Wilmot, Interim Executive Director, turned leadership duties over to Executive Director Patrick Linn, MS, MSHAPI, on January 1, 2016. Dr. Wilmot then continued to assist the District with the search for a new head of research, biologist, and the nascent Zika program.



Mark Kartzinel, Biologist

Also of note, District Biologist Mark Kartzinel was commissioned as a first lieutenant into the United States Army Reserves in late June.

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Dr. Thomas Wilmot, Interim Executive Director, and 2014-2015 Chair, Jacquelyn Thompson-Fresenius welcoming Patrick Linn as the new Executive Director.



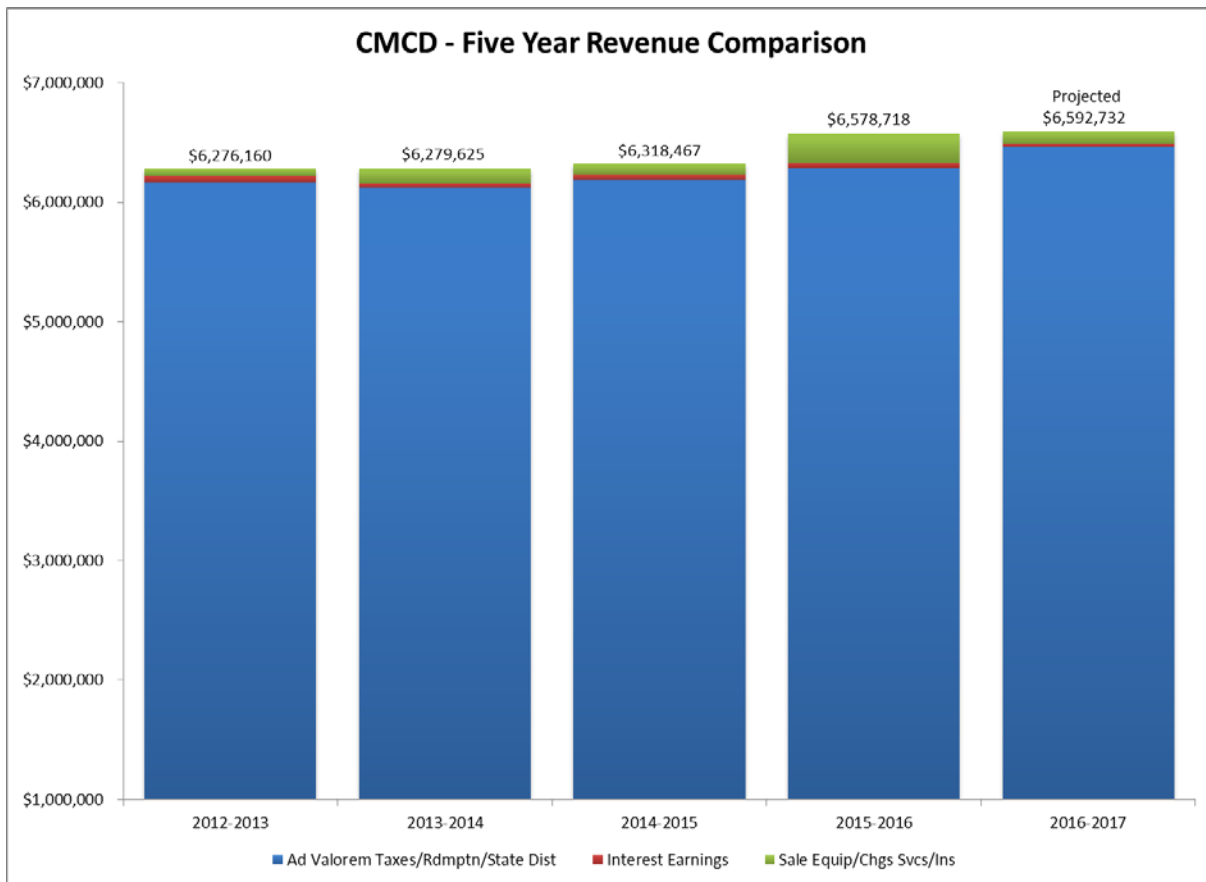
Mark Kartzinel, Biologist being commissioned as a first lieutenant into the U.S. Army, by his father.

Administration

The District concluded fiscal year (FY) 2015-2016 with an ending cash balance of \$4,486,896. The budget is balanced and although reserves have decreased by approximately \$1,000,000, we believe the District has reasonable reserves, as well as adequate cash for FY 2016-2017. The primary financial objective of the District is to maintain low property taxes while efficiently utilizing funds to support its core operations.

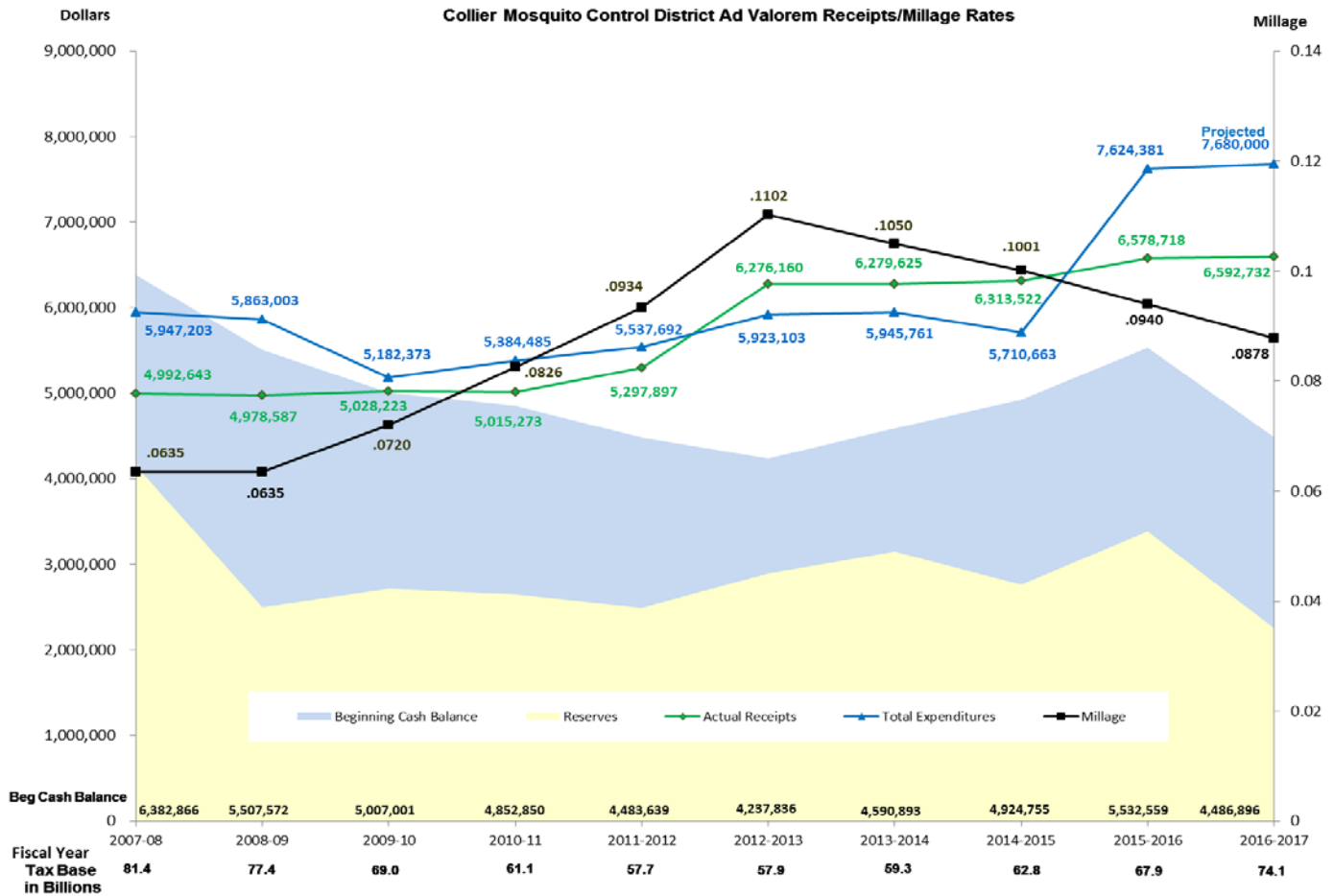
Revenue for FY 2015-2016 was generated by a millage rate of 0.0940 (\$9.40) per hundred thousand of taxable property value, which was at the rolled-back rate. Total proceeds for the FY were \$6,578,718, which included \$241,449 from aerial treatment outside of the District's boundaries. Fiscal year expenditures were \$7,624,381, an increase of thirty-six percent from the prior fiscal year.

The five-year Revenue Comparison Chart shows the prior four years of revenue, and projected income for FY 2016-2017. Based on the average income from the Ave Maria Stewardship Community District, \$100,000 of revenue from that source was included for budgeting purposes in FY 2016-2017.



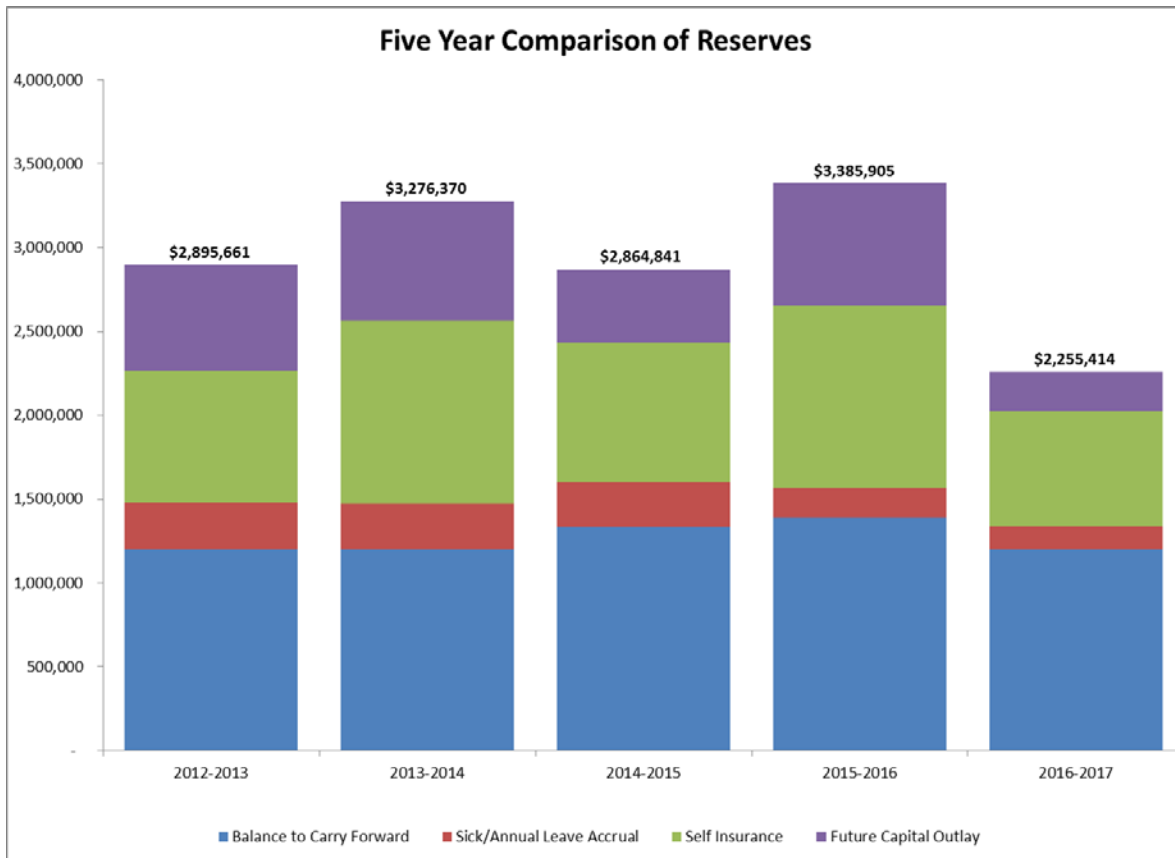
The Ad Valorem Receipts/Millage Rates Chart depicts the Collier County tax base, the millage rate, and the District's cash flow over time. In correlation with the stabilization of the local

economy, the tax base in Collier County has begun to strengthen, increasing by 5.1 billion for FY 2015-2016 and 6.2 billion for FY 2016-2017.



Projected expenses for FY 2016-2017 include: anticipated control program augmentation; increased research and efforts regarding integrated pest management; increased larviciding efforts; changes to the physical structure of the Administration building to accommodate personnel and technology; and new employees in Research and PR/Communications.

As can be seen from the five year comparison of reserves, the Future Capital Outlay account has a reduction of approximately \$500,000, as funds for aircraft refurbishment and structural improvements for the administration building have been moved to the operating budget for FY 2016-2017. The sick and annual leave reserve corresponds to the long-term liability at fiscal year-end. The reserve for self-insurance has decreased by \$400,000. This is offset to some extent by the reduction in liability of health self-insurance.



Employees continue to contribute three percent of their earnings to the FRS. In accordance with Florida Statutes, the District also contributes to the FRS a percentage of employee wages. The percentage is established by the Florida Legislature yearly. On behalf of the pilots, the District contributes to a 401(a) plan, in recognition of the special level of risk associated with their positions.

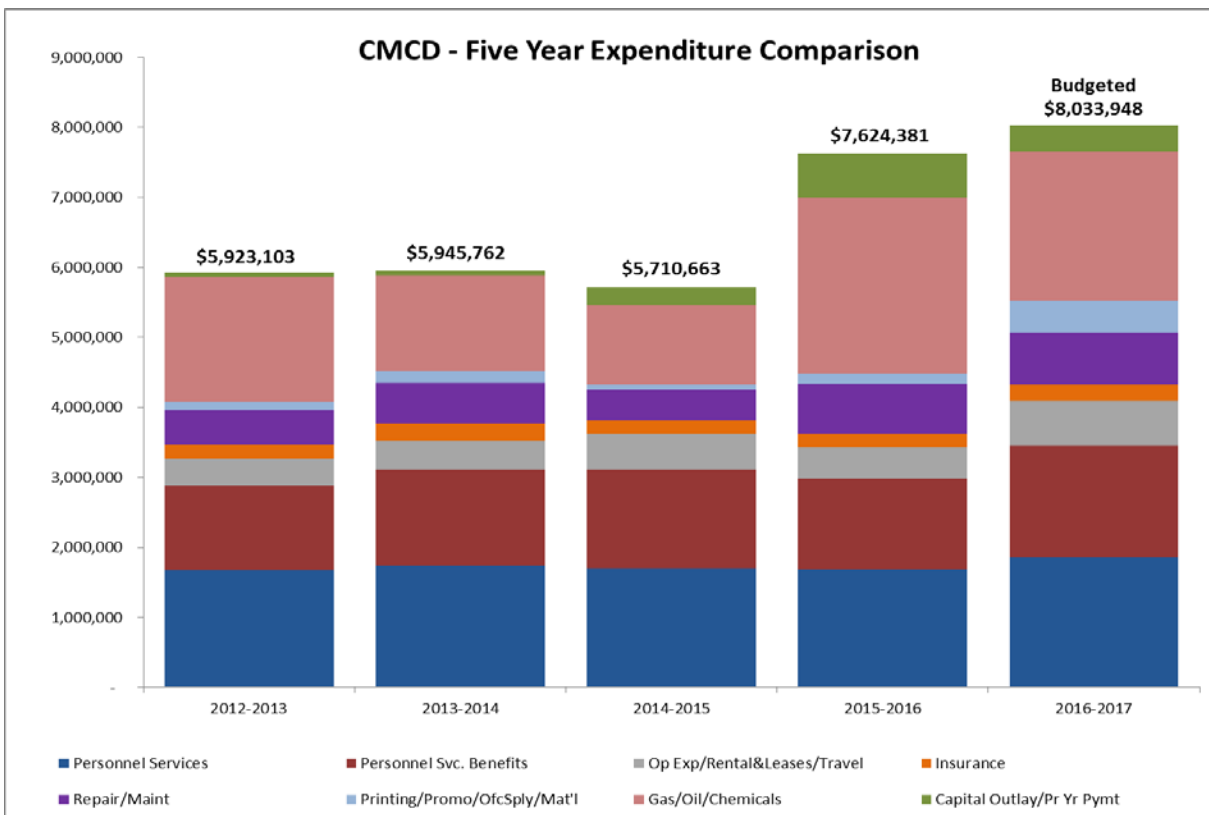
Funding our retirees’ future health benefits is important to the District, thus the Board of Commissioners made discretionary payments totaling \$187,994 to the CMCD Internal Revenue Code Section 115 Retiree Benefit Trust during the fiscal year. Importantly this year, a resolution to sunset the employer paid retiree health plan (Resolution #9 2015-2016) was passed by the Board of Commissioners, and took effect for employees hired on or after August 1st, 2016.

The District maintains a high deductible, defined-contribution health insurance plan that is offset by a personal health fund (PHF). Heritage Consultants, Inc., has been the third-party administrator for six calendar years, and Cigna became our preferred provider organization (PPO) in January of 2013. Employees and their dependents over the age of eighteen are encouraged to participate in a healthy living (Viverae) program which began in January, 2015 and augments the District’s health insurance. Those who participate can earn health insurance premium discounts. The program incorporates biometric screening and a health assessment, as well as an interactive wellness website with questionnaires, e-learning, and health challenges. District Administration is pleased to announce that there will be a 1.5% decrease in health insurance premium costs in the coming year.

The Employee Assistance Program contract with Aetna Resources for living was renewed in April of 2014 for a three-year period, ending in 2017.

The transition of the duties of General Counsel to Mr. William Owens occurred on January 1, 2016. Mr. Owens had been in attendance of BOC meetings well in advance of this transition. The District has employed the services of the firm of Bond, Schoeneck & King, P.A., for over twelve years. The audit agreement with CliftonLarsonAllen LLP will end when the Basic Financial Statements for fiscal year end 2016 are complete and accepted by the Board. The District is currently negotiating an agreement with CliftonLarsonAllen LLP, for an additional two fiscal years.

Ensuring that our facilities and equipment are well-maintained and adequate to meet the needs of the organization is critical to the success of the District. In FY 2015-2016, CMCD spent \$714,000 to repair and maintain aircraft, repair and maintain facilities and address other infrastructure needs. These items are explained in more detail within the Aircraft Maintenance and Facilities Maintenance sections of this report.



CMCD budgets for and purchases control materials based on average usage over time. The District’s larval and adult control efforts are described under Operations, but from a financial standpoint it is important to note that carryover of adult and larval control materials for use during the 2016 season is valued at \$1.2 million dollars.

Facility Management

Many new projects were initiated during FY 2015-2016. Most noticeably, all of the buildings at 600 North Road were painted and a project to install new storm windows began. In addition, old entry gate actuators and keypads were replaced and a 400 gallon larvicide truck was outfitted to support helicopter operations as well as the Buffalo Turbine Mister/Sprayer.



Vehicle storage building being painted

By far, the most extensive project undertaken this year was the extension of a 10 inch water line across airport property to the CMCD hangar to replace an aging fire suppression system. Pittsburg Tank and Tower removed and scrapped the old water tanks and Simplex-Grinnell finished the project by re-engineering the piping to the fire pump. Adding this 10 inch line also has the additional benefits of providing more pressure for firefighters in the area.



Removal of the old windows in the boardroom



Director of Operations John Appezato keeping a close watch during the removal of the old water tanks by Pittsburg Tank and Tower

Training

CMCD supports professional development and holds close the belief that it is essential for the advancement of the District and retention of qualified personnel. The District views staff training is a vital cog in the overall functionality of the organization. The opportunity to network with peers and share knowledge with other professionals in the industry stimulates new ideas, thus helping the District excel at its core mission.

This fiscal year, staff members participated in meetings in direct support of mosquito control activities, such as: the Florida Mosquito Control Association (FMCA) annual meeting, American Mosquito Control Association (AMCA) annual meeting, FMCA Dodd Short Course mosquito control training, FMCA Aerial Fly-in for aerial applications and the Anastasia Arbovirus Workshop. Ken Bouck attended the 2016 HAI Heli-Expo in February and Commissioner Geroy attended the Florida Association of Special District's (FASD) annual meeting in June. Additionally, Mark Kartzinel gave a presentation at the 88th annual FMCA Fall Meeting on "Collier Mosquito Control District summer Surveillance: *Aedes aegypti* and *Ae. albopictus* " as well as a presentation at the 2nd FMCA Entomologist and Biologist Workshop, in the spring of 2016, on "Evaluation of an auto dissemination station for suppressing vectors of dengue, chikungunya and Zika viruses in Florida".

All District employees completed First Aid, CPR, Fire Extinguisher and AED training and recertification in April. Eleven employees participated in an 8-hour course on hazardous waste operations and emergency response. Pilots completed their annual night vision goggle and yearly instrument flight rules training. Operations personnel participated in a driving safety class. Jane Bonds visited the District to provide training for both the Research and Operations staff on ULV Aerial drift modeling. Further, the annual hangar safety meeting, which included procedures for using the District's fuel truck, was attended by all pilots, mechanics, inspectors and research personnel.

In March of this year, Jorge Santiago attended a two-week MD 500 helicopter maintenance course. Also, pilots Nick Klein and Dennis Jones attended a three-day MD 500 recurrent flight training course, which focused on helicopter systems and practical application of emergency flight situations to safely land a helicopter that has lost engine power. Both of these trainings were provided by MD Helicopters in Mesa, Arizona.



In-house training for Inspectors on mosquito identification directed by Dr. Tom Wilmot, Ph.D.



Director of Administration Stacy Welch receiving a Safety Training Grant from PGIT

Throughout the year, Administrative staff participated in product demos for updated accounting software, which is scheduled to be purchased during the 2016-2017 fiscal year. Stacy Welch and Tonya Torian, the District's IT consultant, attended the 2016 Epicor Insights Conference as well as the 2016 Microsoft NAV Users Group Summit to explore their accounting software options. The Administrative staff continues to view webinars on a variety of topics on an ongoing basis.

As always, we are pleased that others have recognized the quality of the effort that CMCD dedicates to employee training and safety. Once again this year, thanks to the information provided by Ken Bouck, CMCD was awarded a \$5,000 grant for pilot safety training from PGIT (Preferred Governmental Insurance Trust).



The employees of the Collier Mosquito Control District



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