



2019 ANNUAL REPORT

2019 BY THE NUMBERS

RESIDENTS SERVED

330,000+

OPERATING BUDGET

\$15 M

TOTAL ACRES LARVICIDED

30,283

POUNDS OF LARVICIDE USED

40,000

INCREASE IN LARVICIDING

38.91%

MOSQUITOFISH DISTRIBUTED

>4,000

GALLONS OF ADULTICIDE USED

5,305 DIBROM

1,549 ANVIL

350 DUET HD

59 MERUS

STUDENTS REACHED IN CLASSROOMS

3,353

NUMBER OF OUTREACH EVENTS

59

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Jacquelyn D. Thompson-Fresenius
Chair

BOARD CHAIR'S MESSAGE

Greetings from the Chair of Collier Mosquito Control District.

I have served on the board continuously since 2006, and in this past year, under the helm of Patrick Linn, our Executive Director, and his extremely talented staff, I have seen a continuation of the enormous strides being made in innovation in all areas of the District.

We have undergone updates to our lab that continue to add to the safety, efficacy, and efficiency of the daily research being done there.

Our Communications staff is reaching more of our community in all areas, including District tours, speaking engagements, social media presence, and in Collier County classrooms.

We have added a fleet of Unmanned Aerial Vehicles, more commonly known as drones, to our flying arsenal along with our latest addition, a Bell 407 helicopter. The drones

have enabled us to obtain aerial views of areas unreachable by ground, helping us determine where breeding grounds might be present, and enable us to treat these areas as well. The Bell 407, a much larger ship than our Hughes/MD 500, will allow our highly trained flight team to increase the safe and effective treatment of our district.

Our Administrative staff continues to grow in expertise and experience, our talented Aviation Maintenance staff provides precise maintenance for the safe operation of all our equipment, and our Operations department all combine experience and technology to enhance all the information that our operations team uses each day to determine how we treat our district to minimize disease and nuisance from mosquitoes.

It is an honor to serve as a representative of our District on your Board of Commissioners.



Patrick P. Linn, MS, MSHAPI
Executive Director

DIRECTOR'S MESSAGE

The 2019 mosquito season was one District employees would term "typical." A light saltmarsh mosquito season gave way to a persistent, yet manageable freshwater mosquito season. Despite the calendar now indicating December, the genus *Mansonia* mosquito continues to pester those in the north and eastern portions of the District most evenings.

What was not "typical" – or even visible – this year was the implementation of changes in how the District collects and manages surveillance data. Treatment decisions are based upon multiple factors, not the least of which is the presence of high numbers and/or disease vector mosquitoes. The District now employs sophisticated software, which is helping those on the front lines to make more educated, precise, data-driven treatment decisions. We are at the forefront of an industry-wide movement toward diversification and maximal use of all aspects of the Integrated Mosquito Management (IMM) paradigm.

In other news: Sometimes, when a project comes to fruition, the effect can be sublime. Such was the case when the District took delivery of its first brand new aircraft in July 2019. Nearly two years in planning, collaborative effort, and preparation led to the District's acquisition of a new Bell 407 helicopter. This acquisition begins the replacement of our rotor wing fleet that averages 40 years in age. The new ship will be used in the ever-increasing larviciding efforts within the District.

The District's Research Department saw through to completion this year a laboratory remodeling project. With the old laboratory reaching 30 years of age, the installation of new cabinetry, countertops, and floor were all overdue. The rejuvenated laboratory is fitting given the technological advances of recent years, including the ability to test for the presence of disease in mosquitoes taken from the field.

The District continues to investigate the efficacy of new control products. Thanks to the contributions of our capable pilot and mechanical staff, the District will have multiple contingencies to remain effective in its mission.

Remote Piloted Aircraft, commonly known as "drones," continue to increase their role in inspections and control services to District residents. This year was the first we treated for larval mosquitoes with a drone, courtesy of collaborative efforts with the Florida Department of Agriculture and Federal Aviation Administration. Drones allow District personnel to treat areas too dangerous to walk through or too tight to reach with typical aerial ships.

Outreach and education efforts at the District continue to expand exponentially. An essential, yet little-known component of integrated mosquito management, is communicating with the community which we serve. Accomplishing successful public health efforts requires an educated public; the District recognizes this and is working tirelessly to get the word out!

OPERATIONS

The Operations Department experienced a number of staff changes this year, most significantly with the retirement of Director of Operations Dominick J. (Johnny) Appezzato, who was with the District for 33 years (see page 11).

Succeeding Appezzato to fill the Director's position was Field Technician Supervisor Nate Phillips. As the Director, Phillips recommended that long-time Field Technician Richie Ryan fill the position as Supervisor.

Another field technician, Derrick Klein, transferred to aerial operations and is training to become a District pilot. Son of retired District Pilot Nick Klein – who retired this year (see page 15) – Derrick is on his way to become his family's second-generation mosquito control pilot.

Seven new field technicians joined the District: Ignacio Barranco, Jon Cleaves, Joe Lee Gallagos, Noe Pineda, and Jorge Puente. Under Phillips' and Ryan's leadership, the Field Technicians became cross-trained and assigned to specific areas of the District, which has led to greater efficiency.

ADULT TREATMENTS

The Operations and Research departments continued to evaluate pyrethroid-based control materials for use in the District's aerial adulticiding program. This year, Merus 3.0 was fully incorporated as the primary adulticide dispersed by the District's helicopter with great success.

Because of the ongoing prevalence of

Mansonia mosquitoes in the northeastern portions of Collier County, Operations and Research staff envisioned a new "targeted approach" against these mosquitoes, with the premise of targeting this species before peak activity within their resting habitat. Using Merus 3.0, this method resulted in an 84 percent reduction in acres treated, 69 percent reduction in gallons of adulticide used, and a 58 percent reduction in mission cost, all while appearing to preserve similar efficacy to a typical Dibrom mission. Three "targeted" missions were performed, and the staff continue to evaluate the effectiveness and sustainability of these missions.

The Research Department evaluated the effectiveness of Duet HD as a replacement for Anvil 10-10 in the District's fixed-wing aircraft. With a similar formulation to Anvil 10-10, Duet HD is a heavier product specifically designed for aerial applications at higher altitudes. Bottle bioassays performed in the laboratory indicated Duet HD is just as effective as Anvil 10-10 against *Culex nigripalpus* and *Aedes taeniorhynchus*.

In August, the Operations and Research Departments collaborated with Clarke Environmental to calibrate one of the District's Skyvans and conduct aerial trials using Duet HD. Initial trials were performed in the Northern Golden Gate Estates area, primarily targeting *Culex nigripalpus*. Field cages and trap data indicated a 70 percent reduction in the mosquito population, similar to typical missions targeting freshwater mosquito



species during this time of year. The three missions using Duet HD resulted in a 60 percent reduction in mosquito populations. The Research and Operations teams will continue evaluating the effectiveness and improve application rate of Duet HD in the 2020 mosquito season.

With a slight rebound from the 2018 population crash of *Aedes taeniorhynchus*, missions within the Henderson Creek area increased this year. Furthermore, *Mansonia* and other freshwater mosquito species kept the Operations Department busy in the eastern portions of the county – including Eastern Golden Gate Estates, Ave Maria, and Immokalee. While Dibrom usage this year remained similar to last year, the District increased its usage of pyrethroid-based control materials by 65 percent. Coupled with constant monitoring for developing pyrethroid-resistance among the District’s mosquitoes, the Operation Department plans continued use of pyrethroid-based control materials as part of its integrated mosquito management program.

LARVAL TREATMENTS

The use of granular larvicides continued increase during the year, and the addition of a new Vortex device mounted on a side-by-side all-terrain-vehicle expanded the capabilities of treating targeted areas. With a dispersal capacity of 180 pounds, treating larger areas is much more efficient than the backpack devices which can hold only 20 pounds of material.

The Research and Operations Departments worked with Valent Biosciences to perform field trials using Vectobac WDG in the

District’s AI Misters and PVI3 Drone. The AI Rangers and AI Superduty were outfitted for the application of Vectobac I2AS and Vectobac WDG, respectively. Calibration efforts were a success, and the application equipment was incorporated for use in the District’s integrated mosquito management program.

Several characterization and field trials were performed using the liquid larvicide capabilities of the PVI3 drone. The PVI3 drone was optimized for proper application of Vectobac WDG – with a 30-40 foot swath resulting in nearly 100 percent mortality within larval assay cups 24 hours post-treatment. Field trials indicated similar results, with an 80 percent reduction in mosquito larvae in artificial containers and 50 percent reduction in overall containers harboring mosquito larvae two weeks post-treatment. Field results indicated proper delivery of the control material to containers and other cryptic habitats at the desired application rate within the treatment block, reducing container inhabiting mosquito larvae.

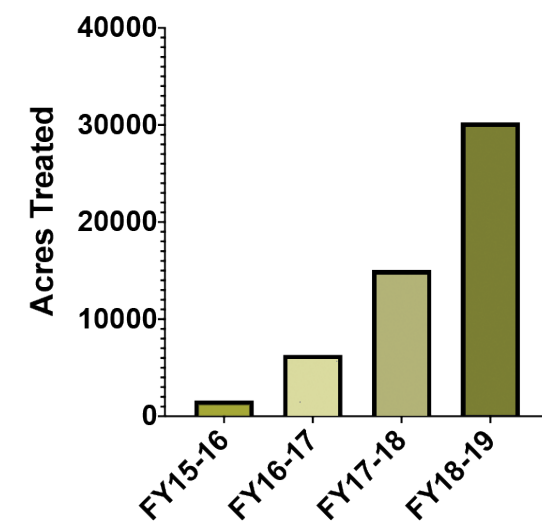
The Operations Department more than doubled their larvicide applications from District trucks, Buffalo Turbine and AI Misters, helicopter, and PVI3 drone. A total of 30,283 acres were treated during the 2018-2019 fiscal year – up from 15,072 acres treated the previous year.

Pre-treatment of the District’s saltmarsh areas continued with nearly 5,000 acres treated with 40,000 pounds of Natular G30 or Vectoprime FG – a 25 percent increase from the previous year.

The District also began using the organic material, Vectomax FG, for targeting freshwater mosquito species in the inland areas of the District. The Operations Department increased their usage of granular larvicide (Natular G30, Vectomax FG and Vectoprime FG) targeting freshwater mosquito species with over 3,000 acres treated during the 2018-2019 fiscal year.

The Operations Department increased the use of Vectobac WDG using the Buffalo Turbine and AI Misters to target container inhabiting mosquitoes, such as *Aedes aegypti*. Larviciding missions targeting container species more than doubled – with 11,078 acres treated with 5,539 pounds of Vectobac WDG.

LARVICIDE USAGE INCREASES



RETIREMENT

Johnny Appezatto

The District bid a fond farewell to Dominick J. (Johnny) Appezatto, director of operations, in May after an impressive 33-year career at the District.

During his employment, he positively impacted nearly every aspect of our Operations Department. He started to work at mosquito control as an inspector, and was promoted to chief inspector in 1989. Appezatto became director of operations in June of 2012, the position he held upon his retirement in 2019.

TECHNICAL DEVELOPMENT

The use of Unmanned Aircraft Systems, or drones, is being closely followed in the mosquito control industry and the District quickly became an early adopter of the devices. A Technical Development department was established, charged with focusing on the use of drones in District operations. Peter Brake was named Director of Technical Development, and intern Sara Grant from Florida Gulf Coast University joined the department.

The following drones were purchased to conduct inspections or to disperse control materials:

- PV13 – apply materials
- Splashdrone – underwater inspection
- 3 Mavics – inspection
- Phantom 4 with NDVI camera – inspection

The drones captured images from highly detailed photos of canals, mangrove forests, and other known habitat areas. That information helped to reduce treatment block sizes designed previously from Google Earth maps and helped to create treatment maps for the PV13 drone. Brake worked with the Florida Department of Agriculture and Consumer Services and the Federal Aviation Administration to receive

the state's first authorization for drone application of control materials.

That authorization led to calibration and droplet testing of the PV13 with help from Valent BioSciences. The testing showed a remarkable droplet spectrum and droplets were seen up to 200 feet away with an effective swath of 40 feet.

By the end of the year, the drone fleet:

- acquired 30,000 images used for mapping purposes
- logged 86 hours of flight time between all drones
- flew a total 530 miles of mapping and training flights
- applied liquid and granular larvicides

Using the drones for wind information and other meteorological data gathering is continuing, which could provide a more economical source of information for District pilots and the Research Department rather than relying on permanent weather stations.



AIRCRAFT MAINTENANCE

A brand-new aircraft arrived at the District in July: a Bell 407 GXi helicopter with tail number N239MC. It is the first time in the District's history that a new ship was purchased; all others were used. An Isolair granular application system was also purchased for the Bell.

As the District planned for the purchase of the \$3.7-million ship, a Hughes MD 500 was sold (tail number N102CW).

Aircraft maintenance staff replaced radar altimeter systems in all three Skyvans fixed-wing aircraft with an updated more reliable Garmin model—GRA 55. While the Skyvans are reliable and very adequate for the District's aduiciding program, maintenance and replacement parts are becoming more difficult to locate for the nearly 50-year-old airplanes. That's why staff began the long process of exploring options for replacements.

PILOTS/AIRCRAFT

For the first time in the District's nearly 70-year history, a female pilot joined the ranks of the flight crew. Beth Hamner holds CFI, CFII, and MEI status and passed both the Public Health and Aerial Applicator exams. She quickly began serving as pilot-in-command for Skyvan missions, and she began helicopter training under the tutelage of District Pilot Mike Berkitsch.

District Pilots Kevin Dunleavy and Berkitsch completed Bell 407 GXi flight training at the Bell training facility in Fort

Worth, Texas, during the summer. Berkitsch continued his training under Dunleavy to obtain a fixed-wing license.

To enhance the maintenance staff's safety in the hangar, the District purchased two new B4 mobile work platforms. The platforms are much safer than ladders when performing lengthier jobs on the aircraft. Two mobile maintenance stands were purchased specifically for performing work on the Bell 407, which not only increases safety for the staff but also provides easier access to all areas of the aircraft.

A new battery-powered Lektro aircraft tug replaced the gas-powered tug, which was purchased in 1986.

Maintenance personnel continued their educations, with Jim Deli completing Honeywell TPE331 field maintenance factory training and Jose Hidalgo completing both the MD500 and the Bell 407 GXi field maintenance factory training.

The two pilots flew the new helicopter to Naples in July. Once it arrived, it was soon taken out of service for the installation of the AGNAV systems and the Isolair side hoppers.

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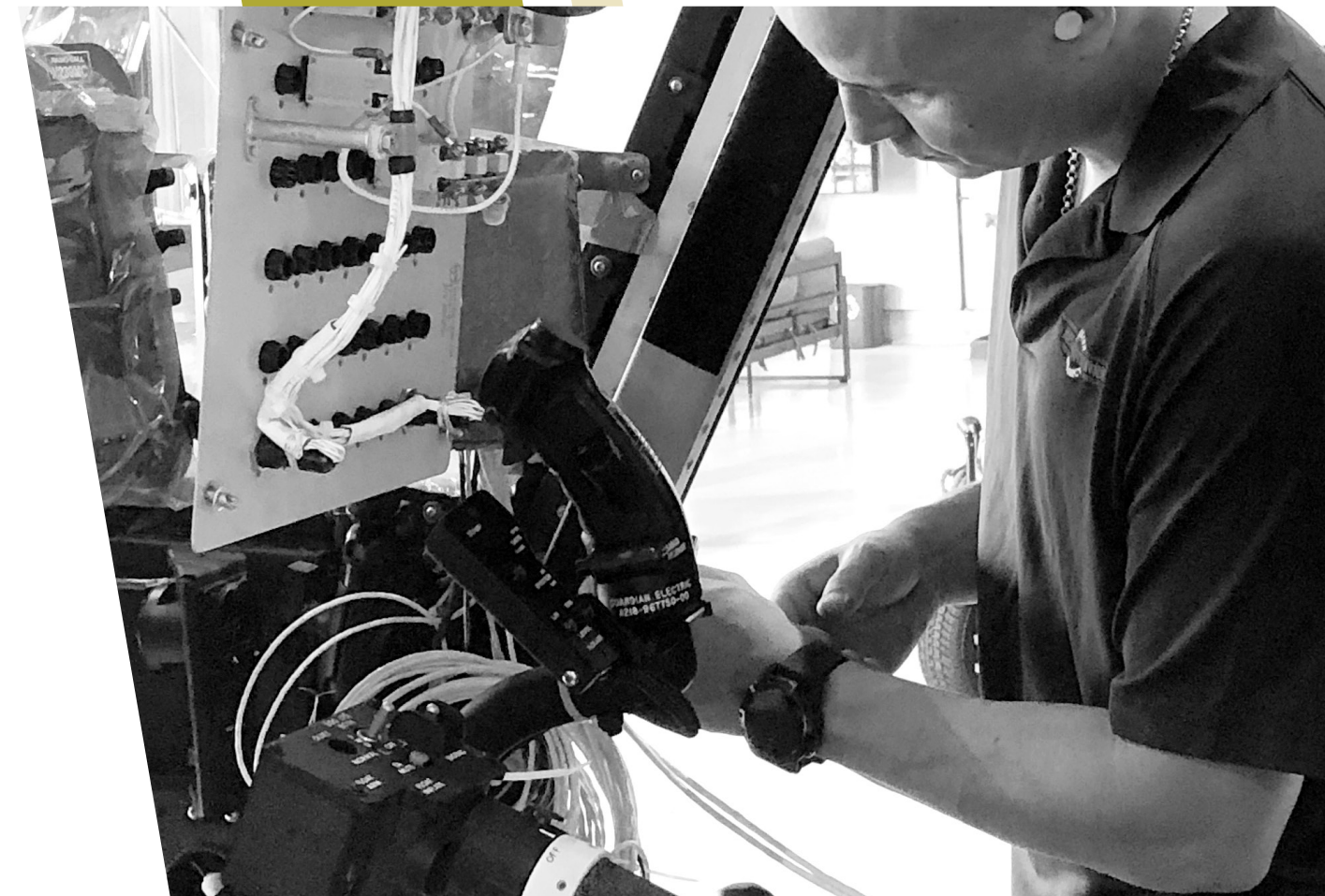


RETIREMENT

Nick Klein

District Pilot Nick Klein retired from his duties in 2019. An avid flyer, Klein began flying gliders at the age of 16, then piloted commercial planes before beginning work at Collier Mosquito Control District.

Klein was a dedicated pilot who served the District for 28 years.



RESEARCH

The Research Department maintained intensive disease vector and arbovirus surveillance throughout 2019. To support field surveillance during the peak season, Brandon Healy was brought in as a Seasonal Research Assistant to increase the Department's capabilities.

The expansion of the *Aedes* surveillance program included placement of additional BG-Sentinel traps and Ovitraps in "high-risk" areas of the District. These traps supported continuous tracking of the *Aedes*, assisted Operations by helping to identify areas for liquid larvicide missions using the District's Buffalo Turbine and AI Mister, and aided the Research Department in monitoring the effectiveness of larvicide missions.

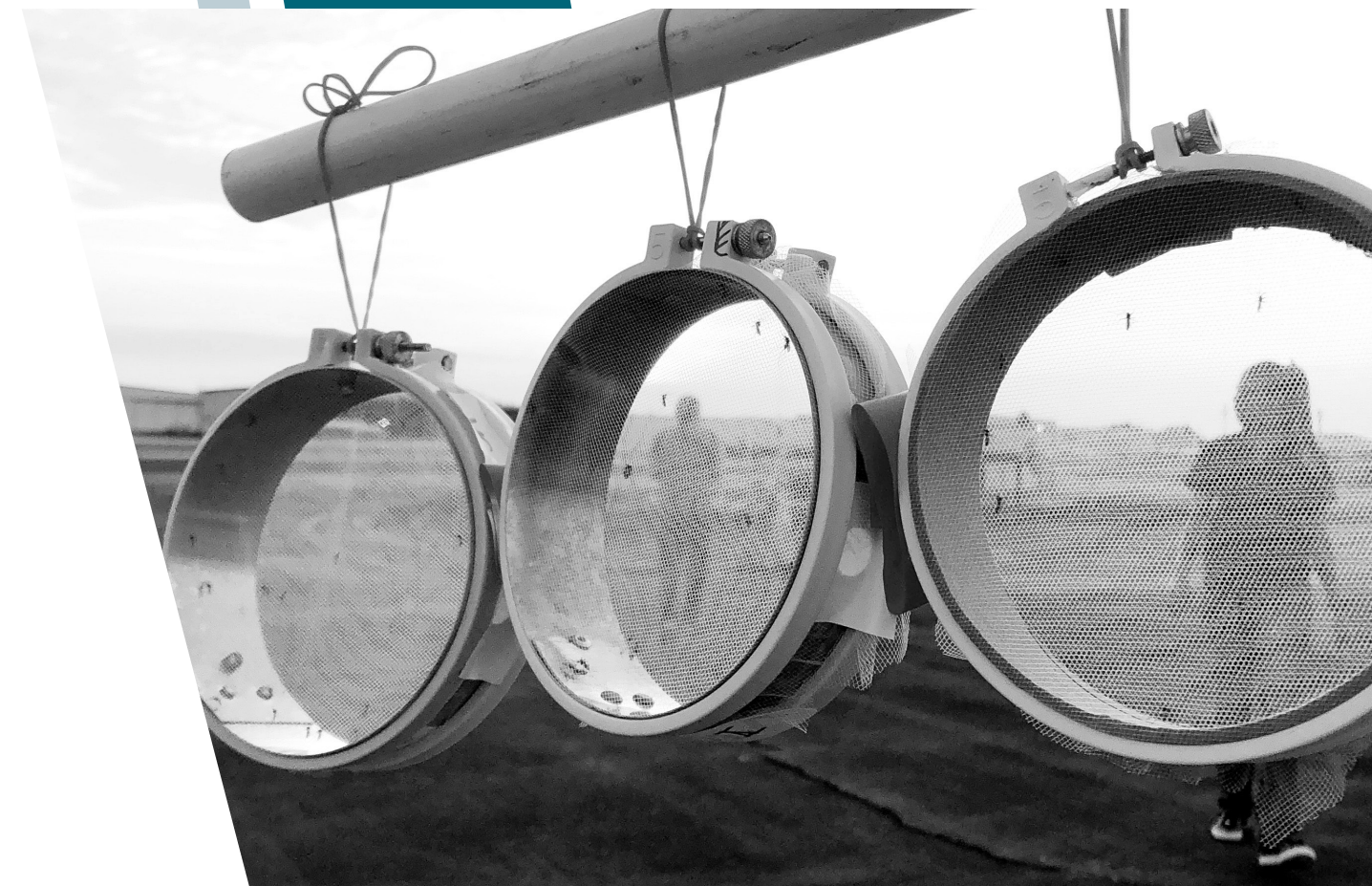
Tracking *Aedes* populations through this increased surveillance proved to be foresight as Collier County continued to see importations of arbovirus cases in humans. From October 2018 through October 2019, three travel associated Zika virus importations occurred as infected travelers returned from abroad. The late 2019 localized outbreak of Dengue virus in Miami-Dade and Broward counties heightened the District's vigilance for surveillance and testing, and one travel-associated case of Dengue was reported in Collier County. Surveillance continued by trapping *Aedes* mosquitoes using BG-Sentinel traps and testing mosquito pools for the presence of Zika, Dengue and Chikungunya viruses. In total, 20 mosquito pools were tested by real-time PCR. Virus was not detected in any mosquito pool tested.

Throughout the year, the Research team streamlined arbovirus detection methods, which increased in-house disease testing capabilities. After consideration of various techniques for disease testing, staff adopted the Co-Diagnostics Inc. Vector Smart™ kits for testing of both *Aedes* and *Culex* pools. These tests include the Vector Smart™ Zika, Dengue, and Chikungunya Triplex Assay and the Vector Smart™ West Nile, St. Louis Encephalitis, and Eastern Equine Encephalitis Triplex Assay. These tests allowed for one simple protocol for all mosquito pools, include a positive control for validation purposes, and were half the cost of disease testing kits previously used in the District's laboratory.

During the year, much of northern and central Florida experienced heightened activity of West Nile Virus and Eastern Equine Encephalitis Virus. In response to continued protection of public health, the District expanded endemic viral testing by doubling the number of Gravid and CDC-Light traps throughout the county. More than 700 mosquito pools containing *Culex quinquefasciatus* and *Culex nigripalpus* were tested for West Nile, St. Louis Encephalitis, and Eastern Equine Encephalitis viruses using both RAMP and real-time PCR assays. A small number of pools indicated the presence of West Nile virus using the RAMP assay, which influenced adulticide missions in associated areas of the county.

MOSQUITOFISH PROGRAM

The District's Mosquitofish Program expanded this year, after its launch in 2018. Led by Biologist Rachel Bales, a robust



cultivation system was added using the Gambusia Solutions two-tank configuration equipped with an 800-gallon breeding tank and stock tank. *Gambusia holbrooki* were collected from Collier County's waterways for initial stocking of the new tanks.

The Research and Communications departments collaborated to inform residents about this biological means of helping to control mosquitoes. Bales provided several interviews with local news agencies, sharing information on the usefulness of mosquitofish and explained how it fits with the District's integrated mosquito management program. Throughout the summer rainy months, District residents could attend "Walk-in Wednesdays" to pick up free fish anytime that day or could make appointments with Bales to acquire fish at another time. During the past 12 months, the District distributed more than 4,000 fish to 71 households.

INSECTICIDE RESISTANCE MONITORING PROGRAM

The Research staff continued to engage in a comprehensive insecticide resistance monitoring program. This year, the District began resistance monitoring in *Aedes taeniorhynchus* and *Culex nigripalpus* using the CDC Bottle Bioassay. Despite another slow saltmarsh season, four populations of local saltmarsh mosquitoes were tested against Dibrom, Merus 3.0, Anvil 10-10, and Duet HD. Five populations of local *Culex nigripalpus* were also examined. No resistance was detected with any of the products tested for either species of mosquito.

In March, Research Director Dr. Keira

Lucas and Biologist Rachel Bales attended a workshop hosted by the Centers for Disease Control and Prevention. During the workshop, they learned variations to the CDC Bottle Bioassay that detect insecticide resistance attributed to metabolic capabilities. They successfully incorporated those methods into the District's insecticide resistance monitoring program. As a result, they determined that metabolic resistance attributed to insecticide detoxification enzyme activity plays an active role in the pyrethroid-resistance status of Collier County's *Culex quinquefasciatus* populations. Understanding what modes of action are contributing to resistance allows the District to make informed decisions on which control materials are most effective against specific mosquito species.

The Research Department continued collaborations with the Navy Entomology Center of Excellence – CMAVE Detachment and the United States Department of Agriculture – Agricultural Research Service to better understand the genetic predispositions of pyrethroid-resistance in *Aedes aegypti* mosquitoes. In May, the District hosted Navy and USDA scientists to conduct aerial field cage trials using Merus 3.0 to determine the effect of pyrethroid-based control materials against various degrees of pyrethroid-resistance in *Aedes aegypti*. The goal of the project was to determine the operational significance of genetics-based detection of pyrethroid-resistance in *Aedes aegypti*.

With the extensive use of spinosad-based larvicides and the potential for the development of resistance, the Research

Department devised a protocol for spinosad resistance monitoring and established baseline susceptibility statuses for *Culex quinquefasciatus* and *Aedes* species of mosquitoes. These mosquito species are most extensively targeted with spinosad-based larvicides.

IDENTIFICATION OF MANSONIA HABITAT

As with previous years, the inland communities of Collier County were plagued by *Mansonia* mosquitoes. The majority of aerial adulticiding missions planned in the Ave Maria and Immokalee areas primarily targeted these highly aggressive biters. The Research and Operations departments collaborated to develop a method for *Mansonia* surveillance and habitat identification.

Historical records were analyzed to identify areas of the District affected by *Mansonia*; these areas included Ave Maria, Immokalee, and Eastern Golden Gate Estates. The District then set out to map areas containing potential *Mansonia* habitat: bodies of inland waterways dense with invasive water lettuce and water hyacinth. Using both CDC-light and Emergence traps, *Mansonia* mosquitoes were found in all locations populated with the invasive water plants. Additionally, *Anopheles*, *Culex*, and *Uranotaenia* mosquito species were also found associated with *Mansonia* habitat. Data collected during summer months indicated that as many as 600,000 *Mansonia* mosquitoes can emerge off a single acre of aquatic weed habitat per trap duration. By the end of the year, hundreds of acres of invasive aquatic weeds were identified by

the District, with the potential to produce millions of *Mansonia* daily. The Research and Operations teams continue identifying *Mansonia* habitat and strategizing solutions to combat *Mansonia* mosquitoes, as well as invasive aquatic weeds.

FIELDSEEKER AND DATABASE DEVELOPMENT

Research Entomologist Dr. Rebecca Heinig worked through the year beta testing and implementing FieldSeeker as the primary surveillance tool for the District. The District is an early adopter of FieldSeeker, and Dr. Heinig worked closely with software developers at Frontier Precision on a biweekly basis to optimize the program for mosquito control operations, identifying software glitches, producing operationally significant reports, and creating an easy-to-use interface for District staff. Dr. Heinig hosted several training seminars for Operations and Research staff throughout the year in order to fully implement FieldSeeker into the District's surveillance programs. By the end of the year, Fieldseeker was used by the District to manage landing rate and trap localities, input landing rate and trap data, store arbovirus testing results, plan proposed treatment areas, and create custom data reports.

With the transition from paper records to GeoPro and, more recently, to Fieldseeker, Dr. Heinig has also been working to create a digital archive of historical records – merging old paper records and digital GeoPro data into a single archive accessible on the District's network. With this ability, research personnel are able to easily obtain historical records from one simple database

for analysis. To date, this has already been influential in tracking yearly *Mansonia* species abundance and identifying *Mansonia* habitat within the county. This has also helped determine the effect of Hurricane Irma on *Culex nigripalpus* populations relative to service request inputs. To our surprise, Hurricane Irma did not result in increased floodwater mosquito populations compared to previous years, despite an increase in service requests. Instead, we concluded that human encounter rates to typical population numbers were enhanced due to increased outdoor activities due to the lack of air conditioning.

STUDENT INTERNS

The Research Department hosted a CDC Southeastern Center of Excellence-funded intern Emory Babcock in the summer. Babcock is a student at Tulane University working on her Master's in Public Health and Tropical Medicine. During her eight-week stay with the District, Babcock performed CDC Bottle Bioassays for insecticide resistance monitoring. She also assisted with *Aedes aegypti* surveillance activities.

Alexandria Watkins continued to work for the District as a Research Intern. This year, she completed her senior research project with the District, which fulfilled her degree requirements at Florida Gulf Coast University. Her project focused on conducting a survey of mosquito species found in ornamental bromeliads of the Naples Botanical Gardens and determined their resistance statuses to pyrethroid and organophosphate-based control materials. Through this project, Watkins developed

a collaborative partnership with several ecologists and environmental scientists to understand the role of botanical garden bromeliad collections in harboring disease vector mosquito species and determine the best mode-of-action to reduce mosquito populations. In March, she was accepted into AMCA's Young Professionals Industry Shadowing Program, in which she received a travel award to attend the 2019 AMCA annual meeting and had the opportunity to work closely with a mentor from ADAPCO.

The District also hosted two high school students who shadowed research personnel. Isabella Stapp, a senior at Seacrest Country Day School, shadowed Biologist Rachel Bales to learn more about aquaculture in order to develop a program at her high school that focuses on propagation of mosquitofish. Stapp assisted the District with handing out mosquitofish to residents and maintaining the *Gambusia* tanks.

The District also began hosting Diane Medina Batista as part of Leadership Collier Foundations Mentor Mingles Program. Diane, a senior at Community School and a Youth Leadership Collier 2019 graduate, will continue to visit the District as a shadowing student throughout her senior year. With an interest in chemistry, Barista learned about the dynamics of a research and operational-based laboratory, and the role chemistry plays in mosquito control operations.



IDENTIFICATION OF SALTMARSH MOSQUITO HABITAT

The Research and Operations Departments began using DJI Mavic Pro Platinum drones for the identification of saltmarsh mosquito habitat. *Aedes taeniorhynchus* lays her eggs in the high marsh areas of mangrove forests, just above the waterline. The goal of this project was to determine if Visible Atmospherically Resistant Index (VARI) mapping using the District's drones could assist the Research and Operations teams to identify the mangrove shelf where saltmarsh

mosquitoes breed. Through soil collection and eggshell isolation in the transition zones identified through VARI mapping, we were able to identify areas that produce the greatest abundance of *Aedes taeniorhynchus* mosquitoes. From this study, Operations has been able to identify areas within larviciding blocks that do not serve as suitable habitat for saltmarsh mosquitoes and make changes to their larviciding block. In particular, 80 acres was removed from our HWY 92 block – saving the District over \$10,000 in larviciding cost.



PUBLIC RELATIONS/EDUCATION/ COMMUNITY OUTREACH

The District's Communications staff performs the most basic of the organization's integrated mosquito management program by educating the public, maintaining media relations, and participating in community events that provide numerous opportunities to talk with citizens.

The Communication staff collaborated with other District departments to promote drone operations, unveil the new 800-gallon *Gambusia holbrooki* (mosquitofish) tanks, and introduce the new Bell 407 helicopter to the public. From media interviews to creating marketing materials, the staff provided a wide array of methods and tools to deliver information to residents. The addition of an Instagram account extended the District's social media reach beyond Facebook and Twitter.

Public Outreach Specialist Andrea McKinney continued to present curriculum aligned with Sunshine State Standards to second grade classrooms, reaching more than 3,300 students this year. Her lessons not only illustrated the mosquito lifecycle but established clear reasoning on the importance of emptying containers of water. Throughout the summer months, her presentations to students in a variety of camps furthered the message to additional grade levels. Now in her second year of classroom presentations, students

throughout Collier County refer to her as "The Mosquito Lady." McKinney developed a seventh-grade program and met with science teachers to share the content for feedback. She intends to take it into classrooms early next year.

The 2019 Open House drew nearly 400 guests to the District's campus in April. Community organizations were once again invited to participate with their own displays at the event. A few of the community partners who participated included the Collier County Sheriff's Office, City of Naples Police, the Florida Department of Health, and Collier Med Flight.

Many of these community partners conduct their own events and regularly invite the District to participate with a display. Throughout the year, the Communication staff represented the District at 59 community events including summer camps, club and neighborhood presentations, and tours of the District's campus.



ADMINISTRATION

Utilizing prudent budgeting and retaining a satisfactory reserve level, the District finished fiscal year (FY) 2018-2019 with an ending cash balance of \$11,192,060. The budget was balanced, and by design, remains flexible to address the ever-changing variables in the mosquito control season and environment. Revenue for FY 2018-2019 was generated by a millage rate of 0.1720 mills (\$17.20) per one-hundred thousand dollars of taxable property value.

Total proceeds for the FY were \$16,309,766, which included \$294,773 from aerial treatment outside of the District's boundaries. Fiscal year expenditures were \$14,385,530 an increase of 39 percent from the prior fiscal year.

The five-year Revenue Comparison Chart displays the prior four years of revenue and projected income for FY 2019-2020. Revenue remained at the rolled-back rate after an increase two years ago to facilitate

the District's long-range plan, which includes:

- replacement of the aerial and ground fleet
- upgrade of the infrastructure at the Naples Headquarters facility
- expand the footprint in Immokalee to better serve the residents in that area, and in anticipation of District expansion, due to population growth in outlying areas.

FINANCIALS

Projected expenses and plans for FY 2019-2020 include:

- Purchase of an Ikhana Twin Otter X2
- Refurbish Naples Headquarters tarmac and associated infrastructure
- Creation of a Master Plan for the District's Naples campus
- Commence design of a new Administration Building
- Finish beta testing and launch Field Seeker software operationally

STAFF TRAININGS

Staff attended trainings throughout the year, advancing their knowledge and expertise in areas including mosquito control industry best practices and professional development.

OCT	FMEL Mosquito ID Course	MAY	Florida Government Finance Officers Association
OCT	Sunshine Law Seminar	MAR	UF Aquatic Weed Control
JAN	Dodd Short Courses	JUNE	Hughes 500 Maintenance
JAN	Hughes 500 Flight Training	AUG	FL HR Conference
FEB	HR Fraud Conference	AUG	Annual GAAP Update
MAR	Chemical Spill Training	SEP	Investment Training
MAR	Black Hat IT Training		

- Explore new arbovirus molecular testing methods
- Continue evaluation of alternative control materials
- Assess aquatic weed challenges within (and adjacent to) District boundaries, via drone
- Begin drone deployment for larvicide missions

The Ad Valorem Receipts/Millage Rates Chart depicts the Collier County tax base, the millage rate, and the District's cash flow over time. The tax base in Collier County increased by \$4.6 billion for FY 2019-2020. The Future Capital Outlay account remains in the realm of \$4,000,000 as shown in this diagram. These reserve funds are critical to achieve the long-term projects that commenced during FY 2017-2018. The sick and annual leave reserve equates to the long-term liability at fiscal year-end, and the reserve for self-insurance account allows the district to choose insurance with higher deductibles. These funds would have otherwise been paid to a carrier through premium dollars.

During the year, the employee count increased from 33 to 39 full-time employees, an 18 percent increase in staffing. Ten full-time employees began their tenure with the District, as well as two Commissioners. Two employees retired, one Commissioner retired, and three employees chose to pursue other opportunities. Each employee continues to contribute 3 percent of their earnings to the Florida Retirement System (FRS). In accordance with Florida Statutes, the District also contributes a monthly

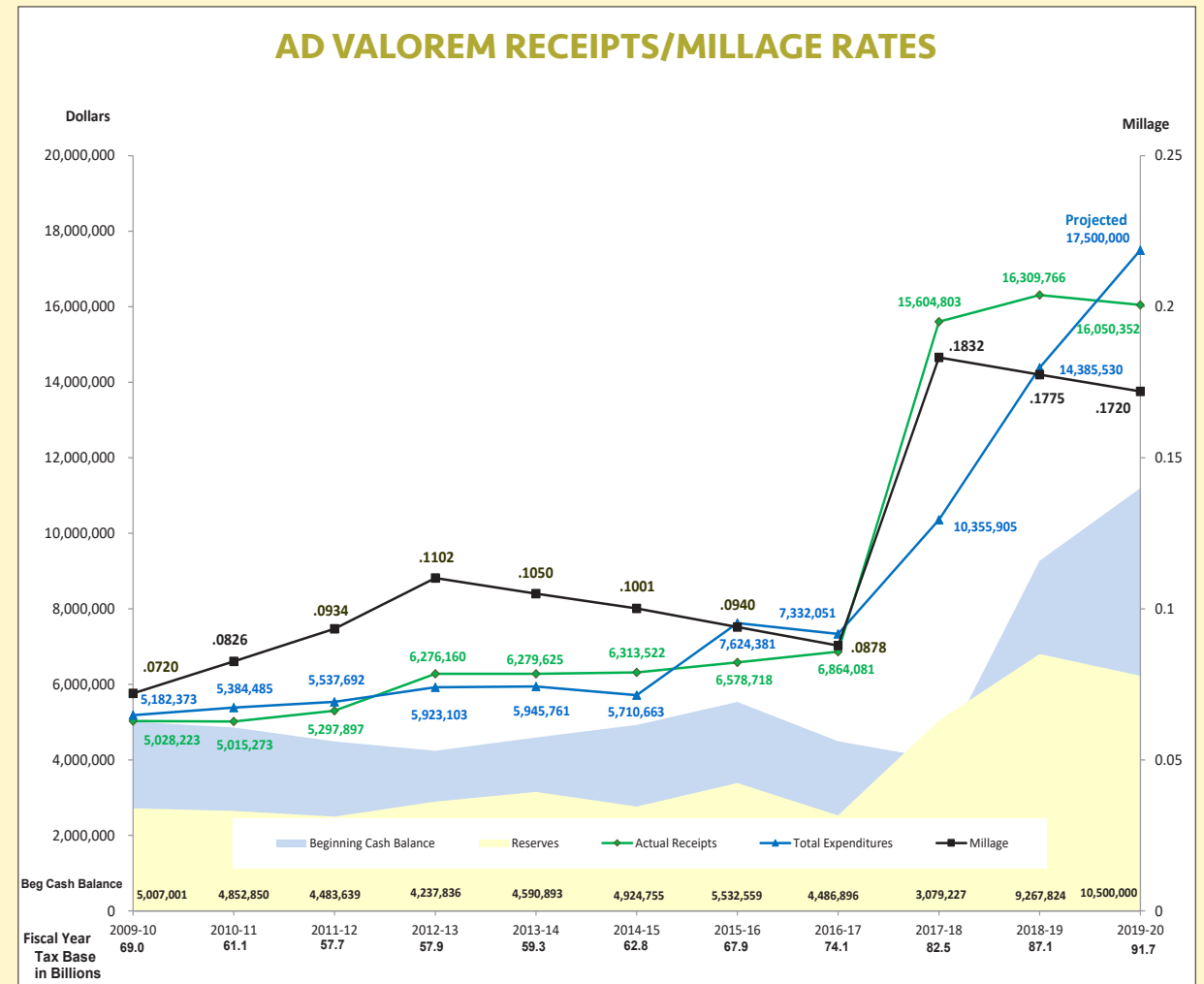
percentage to FRS, based on employee gross wages. This percentage is annually established by the Florida Legislature. Funding the District's retirees' future health benefits is important, thus the Board of Commissioners made discretionary payments totaling \$180,701 to the District's Internal Revenue Code Section 115 Retiree Benefit Trust during the fiscal year.

Effective October 1, 2018, the District moved its health insurance from an individual plan to a self-funded consortium which consists of Florida public entities. The consortium provides the advantage of economies of scale via better discounts through volume pricing and minimized cost of administration. Currently United Health Care is the preferred provider organization (PPO).

For the fifth consecutive year, employees and their dependents over the age of 18 were encouraged to participate in a healthy living program: Go365. The program incorporates a biometric screening, a health assessment, as well as an interactive wellness website. Those who participate can earn health insurance premium discounts as well as other rewards.

During FY 2018-2019, the Board of Commissioners for the District conducted an auditor selection process and hired Grau & Associates as the external auditor for a period of five years with a clause for yearly renewal thereafter. For legal counsel, the District continues to employ the services of Bond, Schoeneck, and King, with Bill Owens serving as District Counsel.

AD VALOREM RECEIPTS/MILLAGE RATES



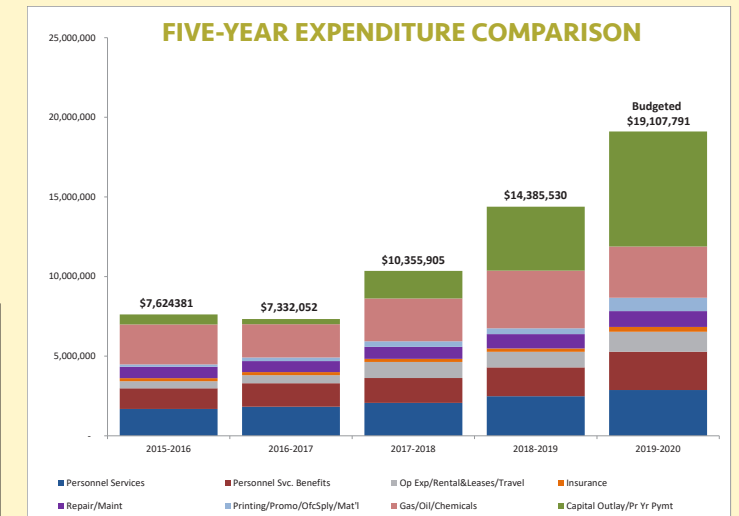
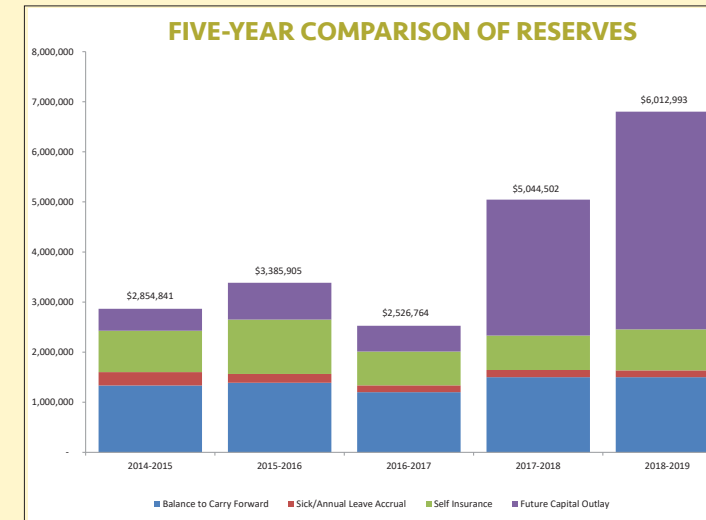
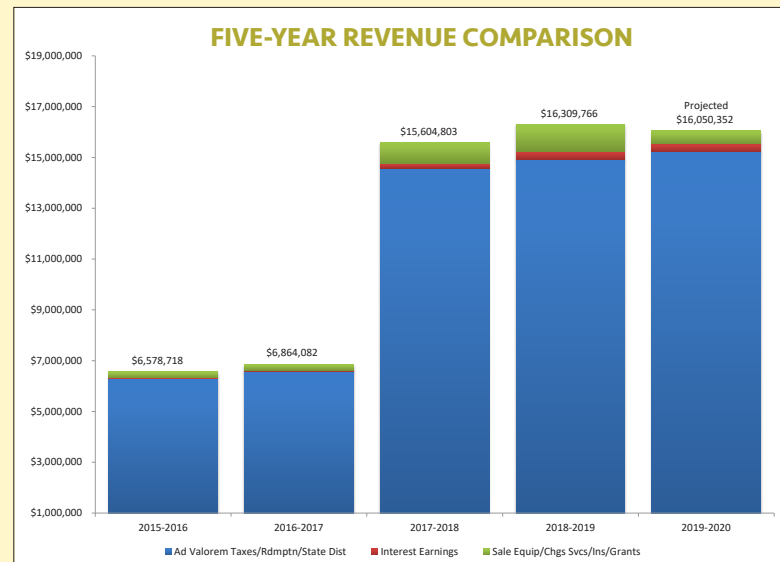
Administrative staff began utilizing the Epicor E10 accounting software for general ledger, accounts payable, and fixed assets on October 1, 2018. In addition, Advanced Requisition Management (ARM), a web-based purchase order system, was implemented January 2019. Accounting Specialist Mark Grazewski, was appointed to the Executive Board of the Epicor User's Group (EUG), as Treasurer.

Stewardship of the facility and equipment has created opportunities for many positive changes to our campus and equipment, including the purchase of a Bell 407 helicopter and AG-NAV navigation systems

for aircraft, replacement of the fire alarm system, LED office light enhancements, and IT security upgrades. Of particular note, are significant construction upgrades in the lab and the hangar to support process improvements. Expenditures totaling \$902,703 facilitated these projects, as well as many other management initiatives.

The District budgets for and purchases control materials based on average usage over time. Carryover of adult and larval control materials for use during the 2020 season is valued at \$2,485,576, representing

a dollar increase in chemical of \$732,815, or 41 percent. The inventory consists of four different adulticides and 10 types of larvicides. Larvicide usage has increased substantially over the past two fiscal years, and are currently used for a multitude of habitats, thus additional types of control materials are on hand for use by field personnel.



VISION

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.

MISSION

The mission of the Collier Mosquito Control District (the District) is to provide valuable service to the community through suppression of both disease carrying and pestiferous mosquito populations by and through the safest and most economical means available. The District uses 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.

BOARD OF COMMISSIONERS



SEAT 1
John Johnson
Vice Chair



SEAT 2
Sandra Lee Buxton



SEAT 3
Jaquelyn D.
Thompson-Fresenius
Chair



SEAT 4
David H. Farmer
Treasurer



SEAT 5
Michael V. Reagen

The Collier Mosquito Control District is an independent special taxing district operating under Chapter 388, Florida Statutes. It is governed by a five-member Board of Commissioners.

Each member of the Board is elected at-large for a four-year term. As elected officials, the Commissioners provide a direct link between government and the residents of the District.

RETIREMENT

Robert D. "Bob" Geroy



Commissioner Bob Geroy retired in January 2019 after serving 28 consecutive years in the elected position. He was first elected to the five-member board in 1991 after friends encouraged him to pursue the seat based on his interest in the District's aerial operations. During his tenure, Geroy's leadership extended beyond the boardroom. He attended local, state and national industry meetings alongside District staff to expand his knowledge about mosquito control operations.

During the February 2019 board meeting, the Commissioners dedicated the District's board room in Geroy's name, marking the event with an engraved plaque now hanging over the room's door.



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