INDIAN RIVER MOSQUITO CONTROL DISTRICT REVIEW FINAL REPORT

September 2023

Prepared for

The Florida Legislature

Prepared by

The Balmoral Group

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Winter Park, FL 32789

Executive Summary

Indian River Mosquito Control District (Indian River MCD) provides service to 352 square miles in the eastern portions of Indian River County, which had a population of 159,690 in 2022. This district features both saltwater and freshwater environments and manages 4,500 acres of coastal mangrove swamps and salt marshes and has developed an extensive impoundment system to manage mosquito populations in these areas. Indian River MCD adjoins several federally and state-owned resource protection areas that are sources of mosquitoes and create mosquito control challenges that district operations must continually manage. The district is located in a rapidly developing area of the state, and the population of Indian River MCD is expected to increase by 29 percent by 2050.

Indian River MCD was established as an independent special district in 1925 and re-created via special act under Chapter 2006-344, *Laws of Florida*. Governance is provided by three commissioners elected to four-year terms. Property taxes are collected to fund the district's program. About 93,000 households pay ad valorem taxes to support the Indian River MCD's operations, and the most recent budget year included about $22.5 million in taxable value. Indian River MCD is a moderately-sized MCD in terms of its budget and staffing, with annual expenditures in the most recent three full fiscal years ranging from $4 to $5 million and staffing counts around 35.

SCOPE

Section 189.0695, *Florida Statutes,* requires the conduct of performance reviews of Independent Mosquito Control Districts. The Balmoral Group was selected by the Office of Program Policy Analysis and Government Accountability to perform the review, which e evaluates the district's programs, activities, and functions, including:

- evaluating the district board's primary function and governance;
- assessing service delivery and comparing similar services provided by municipal or county governments located within the district's boundaries;
- describing district purpose, goals, objectives, performance measures, and performance standards and evaluating the extent to which they are achieved;
- analyzing resources, revenues, and costs of programs and activities; and
- providing recommendations for statutory or budgetary changes to improve the special district's program operations, reduce costs, or reduce duplication.

The Balmoral Group's review found that Indian River MCD delivers a wide variety of mosquito control services effectively and efficiently within the scope of the MCD's charter and applicable laws and regulations. The district has demonstrated effective management of its resources and utilizes them in an efficient manner to achieve its goals and objectives. Indian River MCD has established goals and objectives that are measurable and appropriate to address the district's purpose and has kept arbovirus counts at zero in the current and past three fiscal years. However, the district lacks measurable performance standards with which to assess how well it meets its newly-defined goals and objectives.

Based on its review, The Balmoral Group presents the following recommendations for the improvement of mosquito control services in the Indian River MCD:

- The district could formalize additional performance measures and standards that would allow the district to monitor and track progress toward all its goals and objectives.
- The Legislature could consider amending s. 388.46*, Florida Statutes*, to direct the Florida Coordinating Council on Mosquito Control to form a subcommittee consisting of mosquito professionals and researchers from around the state to develop model goals, objectives, and performance standards and measures to assist MCDs with performance monitoring.

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1. Background

District Description

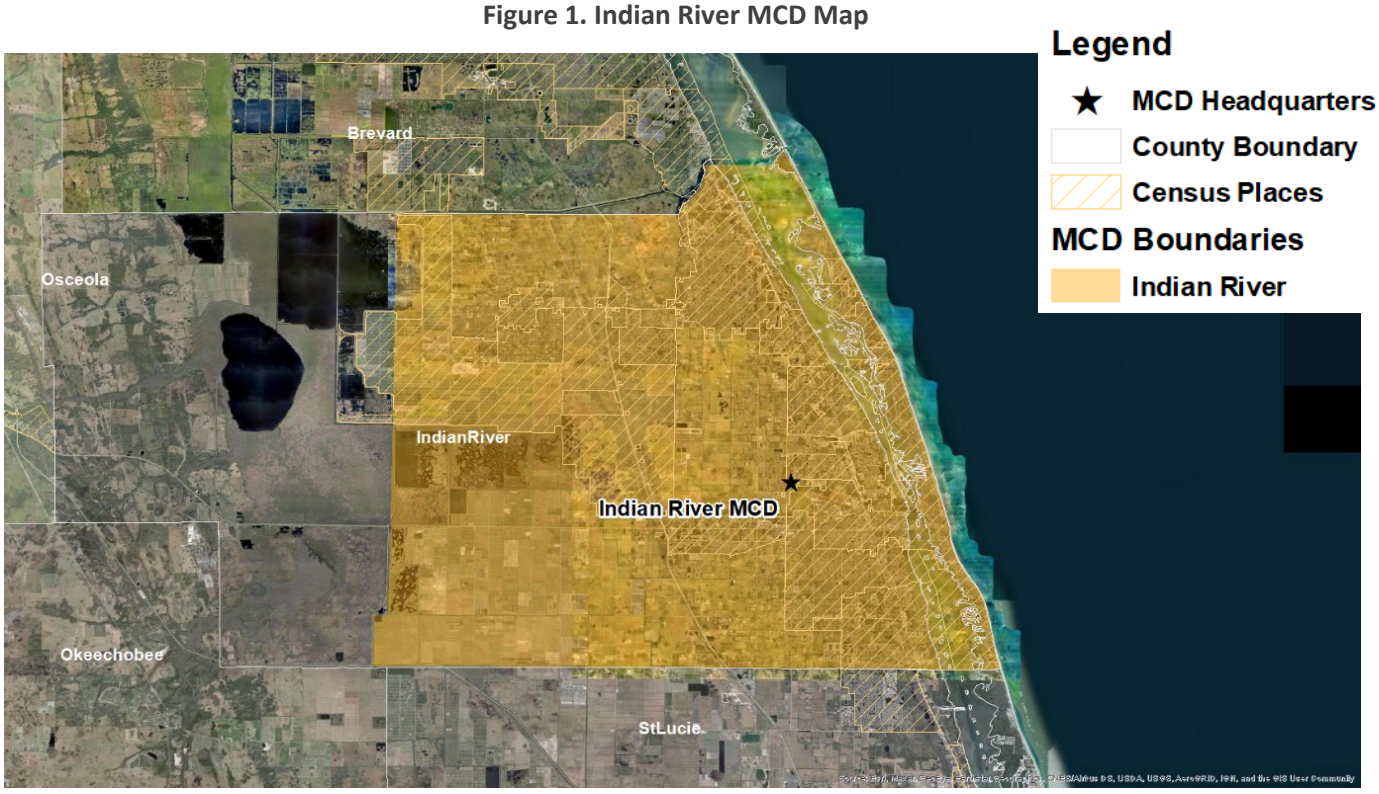
District Purpose

According to district representatives, the purpose of Indian River Mosquito Control District (Indian River MCD) is to provide uninterrupted mosquito control services to the citizens of Indian River County, and develop control methods that are effective and sensitive to Florida's unique natural habitats and wildlife. Since inception, Indian River MCD has been committed to improving the quality of life, facilitating outdoor activities, and protecting the public health in the community by implementing environmentally sound practices that control mosquitoes throughout the district.

Service Area

Indian River MCD provides service to the eastern portion of Indian River County, totaling 352 square miles. Indian River MCD's headquarters is located at 5655 41st Street, Vero Beach, Florida, 32967. **Figure 1** shows a map of Indian River MCD boundary, with the county boundary, and Indian River MCD headquarters marked.

Figure 1. Indian River MCD Map

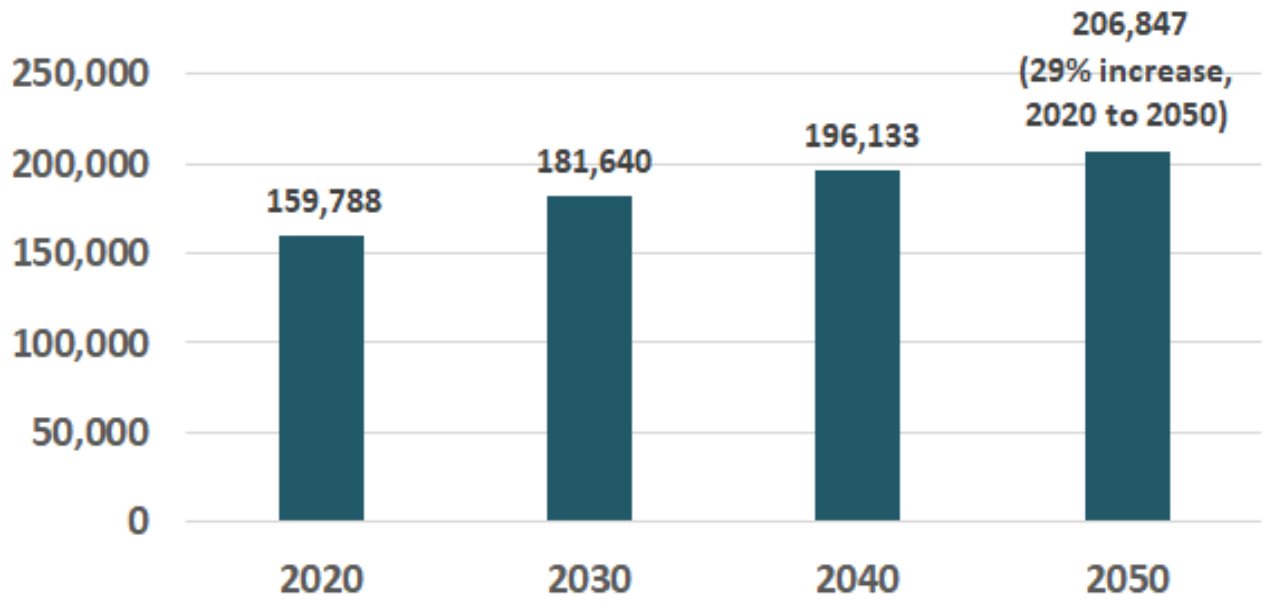


Source: The Balmoral Group (TBG) Work Product, ESRI, US Census, MCDs.

Population

Indian River County's population was estimated at 159,690 persons in 2022 according to the U.S. Census.[1] The Florida Legislature's Office of Economic and Demographic Research (EDR) projects Indian River County's population to increase by 29% through 2050 to 206,847 residents compared to a 2020 baseline. [2] **Figure 2** shows Indian River's projected population estimates calculated by EDR.

Figure 2. Indian River County Population Projection



Source: TBG Work Product, EDR.

District Characteristics

Indian River County is on the east coast of Florida, bordering the Atlantic Ocean. Adjacent counties include Brevard, Osceola, Okeechobee, and St. Lucie. The average annual temperature was 74.6 degrees Fahrenheit and total rainfall was about 45 inches in 2022. Indian River MCD addresses both aggressive coastal, salt marsh mosquitoes as well as freshwater species in the interior of the district. In total, there are 50 mosquito species that are known to be in Indian River County.

Many of the Integrated Pest Management (IPM) efforts described later in the report of the district are focused in areas along the Indian River Lagoon. As such, Indian River MCD is the only district responsible for managing mosquito impoundments as 2,600 acres of saltmarsh wetlands along the Indian River Lagoon are impounded.[3]

The western portion of Indian River MCD is largely rural, but development is encroaching rapidly on undeveloped areas. The eastern half of the district includes several federally and state-owned protected areas that both spawn mosquitoes prolifically and have associated restrictions on Indian River MCD operations.

[1] Population Estimates, July 1, 2022 retrieved from U.S. Census Bureau QuickFacts: United States.
[2] Based on 2021 Estimates, Population: 1970-2050, County projections retrieved from Population and Demographic Data - Florida Products (state.fl.us).
[3] Impoundment management is a source reduction strategy that controls saltmarsh mosquitoes by creating impoundments, which are earthen dikes that isolate salt marshes and swamps from an adjacent estuary. The impoundments are artificially flooded periodically for mosquito control, resulting in the elimination of breeding sites for saltmarsh mosquitoes.

Meteorology is the primary driving force for producing mosquitoes with heavy rainfall events creating standing pools of water that serve as breeding grounds for mosquito species capable of transmitting several mosquito-borne diseases. Changing water levels through tidal events can also produce such pools. Humans contribute to the problem by allowing water to stand in waste containers, garden pots, tires, and other vessels. The characteristics of the natural areas of the district in the eastern areas, combined with the growing population in the rural western areas and the meteorological conditions described above, create an environment conducive to extensive mosquito habitats that require constant mosquito control. The services needed to control mosquitoes include routine surveillance of mosquito-producing habitats, source reduction through impoundment management, aerial and/or ground treatments using pesticides to treat areas known to have large breeding mosquito populations, regular testing for disease transmission in animals, and others described in greater detail later in the report.

Real Property Data

Indian River MCD collects ad valorem taxes to fund district operations. Total taxable value increased to over $23 billion in FY 2022-23, at a millage rate of 0.2500 (**Table 1**). Real property parcels subject to district millage have reached nearly 93,000 parcels over the last four years (**Table 2**). Taxable value of real property parcels increased 25% in Fiscal Year (FY) 2022-23 compared to FY 2019-20, following changes in property values.

Table 1. Millage Rates and Total Taxable Value of Properties Subject to Indian River County MCD Millage

Indian River MCD	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
Millage Rate	0.2515	0.2515	0.2515	0.2500
Taxable Value of Parcels ($Mil.)	$17,924	$18,858	$19,821	$22,486
Taxable Value of Accounts ($Mil.)	$622	$681	$732	$845
Taxable Value of Centrally Assessed Property ($Mil.)[1]	$21	$21	$24	$26
Total Taxable Value ($Mil.)	**$18,567**	**$19,559**	**$20,577**	**$23,357**

Source: Florida Department of Revenue (FDOR).

[1] Centrally assessed property includes railroad and private carline company assessments as defined in s. 12D-2.011, *F.A.C.*

Table 2. Real Property Parcels Subject to District Millage

Indian River MCD	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
Just Value of Parcels ($Mil.)	$26,426	$27,372	$28,839	$35,986
Real Property Parcels Subject to District Millage	91,791	92,391	92,450	92,905
Taxable Value of Parcels ($Mil.)	$17,924	$18,858	$19,821	$22,486

Source: FDOR.

Tangible Personal Property Data

In addition to real property, tangible personal property accounts subject to district millage total 10,361 accounts in FY 2022-23, a decline of 5% since FY 2019-20 (**Table 3**). However, the taxable value of tangible personal property accounts increased in FY 2022-23 by 36% compared to FY 2019-20 due to higher property values.

Table 3. Tangible Personal Property Accounts Subject to District Millage

Indian River MCD	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23
Just Value of Accounts ($Mil.)	$715	$776	$825	$955
Tangible Personal Property Accounts Subject to District Millage	10,909	10,614	10,469	10,361
Taxable Value of Accounts ($Mil.)	$622	$681	$732	$845

Source: FDOR.

History and Composition

Indian River Mosquito Control District was established by the Legislature as an independent special district in 1925 and re-created through a special act under Chapter 2006-344, *Laws of Florida*, to control mosquito populations in Indian River County. In 2011, the powers of the board of commissioners were revised by Chapter 2011-243, *Laws of Florida*, to ". . . do any and all things necessary for the control of mosquitoes and sandflies and diseases transmitted by the same in said district and for this purpose . . . ." Indian River MCD is also subject to Chapter 189, *Florida Statutes*, given its status as an independent special district; Chapter 388, *Florida Statutes,* setting forth the requirements for creating and operating MCDs in this state; and Chapter 5E-13, *Florida Administrative Code*, setting forth rules adopted by the Department of Agriculture and Consumer Services (DACS) for mosquito control program administration. The Indian River MCD Board of Commissioners includes commissioners, a chairperson, secretary/treasurer, and vice chair. Board members are elected to serve four-year terms, with the current board sitting at full capacity for the current and past three fiscal years. Board meetings are held on a monthly basis. No such person shall be qualified to hold office as a commissioner of Indian River MCD unless they are a duly qualified elector of Indian River MCD.

Pursuant to Chapter 388, *Florida Statutes*, the powers and duties of the board of commissioners include:

- Performing all duties necessary for the control and elimination of mosquitoes and other arthropods of public health importance.
- Being authorized to provide for the construction of canals, ditches, drains, dikes, fills, and other necessary works, and to install and maintain pumps, excavators, and other machinery and equipment.
- Preparing and adopting a district budget.
- Being authorized to hold, control, and acquire by gift or purchase for district use any real or personal property.
- Having all the powers of a body corporate, including the power to contract and to employ a director, employees, and others.

As required by s. 388.151, *Florida Statutes,* the Indian River MCD board of commissioners has met at least monthly during the current fiscal year and past three fiscal years. Indian River MCD monthly meetings are open to the public, with minutes and agendas published online following each assembly alongside a meeting schedule. In addition to regular monthly meetings, special meetings may be called to discuss the draft and final budget for the upcoming fiscal year, as well as one-off topics like district banking practices and aerial activities. The number of

meetings and special meetings are shown in **Table 4**. The board's meetings are open to the public and noticed and conducted in accordance with s. 189.015, *Florida Statutes*.

Table 4. Indian River MCD Commissioner Meeting Counts

Commissioner Meetings	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23[1]
Monthly Meetings	12	12	12	7
Special Meetings	8	7	5	0

Source: TBG Work Product, MCD.
[1] 2023 YTD through April.

Intergovernmental Interactions

Indian River MCD works with the St. Johns River Water Management District (SJRWMD), DACS, Florida Department of Environmental Protection (DEP), state parks and aquatic preserves, Florida Fish & Wildlife Conservation Commission (FWC), and United States Fish & Wildlife Service (USFWS) to provide mosquito control services on state and federal lands bordering Indian River MCD boundaries. Indian River MCD also cooperates with the Florida Department of Health (DOH) to monitor for mosquito-transmitted diseases and determine areas of potential infection.

Indian River MCD also participates in research projects. Such research is frequently a collaborative effort with scientists at the University of Florida's Florida Medical Entomology Laboratory (FMEL) in Vero Beach. Other collaborations have included the USFWS, DEP, Harbor Branch Oceanographic Institution, Florida A&M University and other mosquito control organizations.

Indian River MCD cooperates with the City of Fellsmere, City of Vero Beach, City of Sebastian, and Town of Indian River Shores to provide mosquito control services within and near city limits.

Resources for Fiscal Year 2021-22

The published FY 2021-22 millage rate established by Indian River MCD was 0.2515. The district received $5.08 million in revenues and spent $4.14 million in FY 2021-22. The district had 35 paid staff and owned or leased 49 vehicles and one facility with 7 buildings in FY 2021-22 (**Table 5**).

Table 5. Indian River MCD Resources for FY 2021-22

Resource Item	FY 2021-22 Amount
Millage Rate	0.2515
FY 2021-22 Revenues	$5.08 million
FY 2021-22 Expenditures	$4.14 million
Number of Paid Staff	35
Vehicles	4 boats, 30 trucks and vans, 15 utility vehicles
Equipment	Field equipment: 167 Lab equipment: 16 Office equipment: 85 Surveillance equipment: 23 traps, 48 sentinel chickens, 8 coops
Facilities	1 facility, 7 buildings

Source: TBG Work Product, MCD.

2. Findings

Service Delivery

Indian River MCD delivers a wide variety of mosquito control services in all eight areas of IPM effectively and efficiently within the scope of the MCD's charter and applicable laws and regulations.

To assess the delivery of services in the district, The Balmoral Group (TBG) requested information on the geographic characteristics of the district; other local governments to which the district provides services or with which it coordinates efforts; the services provided by the district; similar services provided by other entities; district studies or evaluations of alternative service delivery methods including consolidation of services with other government entities; unique contributions from the district relative to the county or municipalities; local stakeholder perceptions of the relative value of the district's services. In addition, TBG requested information from representatives of the Board of County Commissioners, local health department, and local parks and recreation department on their perceptions of the district's service delivery and efficiency.

Overview of Services

Most mosquito control programs use an IPM approach to control mosquito populations, which targets the different stages of a mosquito's life cycle with various prevention and control measures. IPM addresses eight areas. Surveillance of mosquito populations is an essential component of all IPM programs with chemical treatments based on the surveillance findings. IPM can also include source reduction (e.g., container disposal, water/impoundment management), larviciding and adulticiding (using ground and/or aerial treatments), biological and alternative control, and disease surveillance. Research and education are also important components of IPM programs. See attachment titled, "Integrated Pest Management" for more information. Indian River MCD conducts activities in each of these areas of IPM.

TBG reviewed documentation and interviewed staff and management to assess delivery of services. Indian River MCD activities include:

Mosquito surveillance through ground and aerial surveillance to pinpoint areas of concern and find, identify, and measure mosquito populations. There are 50 species identified within Indian River County. The district uses traps and landing rate counts to monitor adult mosquitoes and CDC light traps to assess population numbers within a given area and other trap types for arbovirus surveillance. Trap collections occur three days per week, instead of weekly as in other MCDs such as the Citrus and South Walton County MCDs. Regardless of type, traps may be baited with carbon dioxide, octanol, or include a small light source as attractants.

Since 1978, Indian River MCD has participated in a state-sponsored program of surveillance for the detection of several mosquito-transmitted viruses (St. Louis encephalitis (SLE), West Nile virus (WNV) and Eastern Equine encephalitis (EEE)). The St. Louis encephalitis/West Nile virus surveillance program conducted by Indian River MCD has two inseparable components. The first component is the use of sentinel chicken flocks to monitor levels of virus transmission from mosquitoes to birds in the county. The district's sentinel chicken program at eight sites also enables weekly arbovirus surveillance, with regular blood samples collected and submitted to a DOH

laboratory. There are eight sentinel chicken sites located throughout the county to assess local mosquito transmission of St. Louis encephalitis, West Nile virus, and Eastern Equine Encephalitis in birds. The second component involves the intensive monitoring of populations of the principal vector mosquito, *Culex nigripalpus*, at two locations in Indian River MCD. Mosquito population monitoring utilizes specialized adult mosquito trapping techniques to monitor changes in the abundance and behavior of the vector mosquito *Culex nigripalpus*. Unlike the encephalitis viruses, which can be detected through sentinel chickens, there are no useful early detection monitoring programs for dengue, Chikungunya or Zika viruses. These viruses are transmitted from mosquitoes to humans only, not chickens. The only indication of these viruses in Florida is the reporting of a human case. Human case investigations involve determining when and where a disease was contracted. The district tracks this information using DOH disease incidence reports published on DOH's website weekly.[4]

Source reduction activities consist of tipping and tossing containers holding water or implementing Rotational Impoundment Management. Indian River MCD's saltmarsh source reduction efforts are largely focused on the management of impoundments along the Indian River Lagoon using pumps to flood sites to prevent saltmarsh mosquitoes from laying their eggs, which eliminates the need for chemical treatment within those areas. Another method is the waste tire program that has been in place for over 20 years. By collecting and disposing of the waste tires, Indian River MCD removes additional mosquito production sites and reduces the threat of disease outbreak. The district began tire collection efforts in 1992 and received funds from DACS to support tire disposal fees. Although the district no longer receives such funding, it has continued the program and receives an exemption from waste tire disposal fees from its local landfill. The district reported that it collected 11.3 tons of tires in FY 2019-20, 15.18 tons in FY 2020-21, and 3.68 tons in FY 2021-22, and that over the last 30 years, it has collected and properly disposed of over 1,127 tons of tires.

Indian River MCD's larviciding program focuses on saltmarsh wetlands along the Indian River Lagoon. Approximately 2,600 acres of these wetlands are impounded and managed. The county's remaining saltmarsh wetlands and adjacent areas which produce mosquitoes require frequent larviciding treatments.

Indian River MCD adulticiding application are carried out by truck-based applications. The application is an Ultra-Low Volume (ULV) spray where small amounts of undiluted pesticide are dispersed by truck mounted equipment. These applications are conducted after sunset, when most mosquitoes are active, and the spray is most effective. Adulticide treatments are determined on a day-to-day basis when surveillance has indicated that mosquito levels justify the need for spraying and is in accordance with state criteria. During widespread mosquito outbreaks or during a medical emergency when there exists a threat to the public of mosquito-transmitted pathogens such as St. Louis encephalitis, West Nile or Zika, Indian River MCD contracts with a company specializing in aerial adulticide spraying for the application of Dibrom.

Indian River MCD participates in research projects as requested. Mosquito control-related topics which have been investigated include saltmarsh management, mosquito ecology, larvicide and adulticide effectiveness and mosquito-transmitted disease surveillance. Entities that collaborate with the district are illustrated in the intergovernmental interactions section. Indian River MCD also conducts regular testing on its pesticides in order to maintain their effectiveness towards controlling mosquito populations. These are performed in a variety of environments including laboratory, semi-field, and field tests.

[4] Mosquito-Borne Disease Surveillance | Florida Department of Health (floridahealth.gov)

Outreach and education events include presentations at schools, civic associations, homeowners' associations, church groups, and participate in various community events to educate the community about mosquitoes and mosquito control.

A summary of the eight areas of IPM in which the district conducts activities is set forth in **Table 6.**

Table 6. Indian River MCD Services Overview

Integrated Pest Management Service	Indian River MCD Services Provided
Mosquito Surveillance	Daily ground and aerial surveillance using trap collection, landing rate counts, and sentinel chicken programs
Disease Surveillance	Regular blood sample collection from sentinel chickens and submittal of samples to the state laboratory in Tampa
Source Reduction	Emptying containers when responding to resident service requests and community education on source reduction; managing impoundments
Larviciding	Application of larvicides using trucks or ATVs; oils and films, soil bacterium, and insect growth regulators
Adulticiding	Delivery of ULV insecticide using trucks or ATVs
Biological and Alternative Control	Mosquito-eating fish hatchery (Gambusia)
Mosquito Control Research	Ongoing research efforts to identify new methods and technologies to improve treatment efficiency
Outreach and Education	Education and outreach facilitated through several avenues, including schools, community events, resident service requests, and public meetings

Source: TBG Work Product, Indian River MCD.

Analysis of Delivery of Services

Indian River MCD delivers several mosquito control services across eight areas of IPM that are within the scope of its charter and purposes outlined in applicable laws and regulations. Indian River MCD provides mosquito control services in all eight areas of IPM as described above. None of the services fall outside the district's charter or applicable laws. The district has significant need for mosquito control given the growing population of the county and extensive natural areas including marshes and swamplands that require specialized mosquito control activities. The district has an extensive surveillance and daily trap monitoring program, as described above and uses a variety of other mosquito control approaches across its operations. TBG's review did not identify any alternative methods for providing the district's services that would reduce the district's costs or improve the district's performance.

Comparison to Other Services

Other local government entities located wholly or partially within the Indian River MCD do not provide similar mosquito control services. TBG reviewed documents available online and interviewed Indian River MCD staff to establish whether services could be or are redundant or overlap with county and municipal government services. Indian River MCD operations are specialized, and TBG's research did not identify any local government entities located wholly or partially within the Indian River MCD that provide services similar to those provided by the district. TBG requested information from representatives of the Board of County Commissioners, local health department, and local parks and recreation department on their perceptions of the district's service delivery and efficiency. TBG received a response from the Chair of the Indian River Board of County Commissioners (BOCC),

who reported that while he feels the district seems to run efficiently, he also feels that consolidation of the district within the county government should be considered in order to potentially improve accountability and transparency of district operations. He further reported that Indian River MCD is performing mosquito control services well, but that moving it under county government could be done smoothly and efficiently and would improve cost effectiveness and transparency to citizens of the county.

In addition, TBG requested information from the county health department and local parks and recreation unit to assess their perceptions of the district's delivery of services but did not receive any response following multiple contact attempts.

Considerations for Consolidations

Consolidation of operations in not recommended for Indian River MCD based on the findings of this review. Some administrative functions of Indian River MCD have counterparts in county government, including human resources, finance, information technology, and fleet management. Due to the specialized operations of mosquito control, there is limited opportunity for improvements in cost and efficiency by transferring the duties of Indian River MCD staff to these parallel county offices. If Indian River County wished to consider consolidation of the district, it could initiate a conversation with Indian River MCD regarding potential efficiency improvements. From TBG's review of district operations, the district appears to be providing needed services in an efficient and effective manner; thus, TBG does not recommend consolidation at this time.

Resource Management

Indian River MCD has effective management of its resources and utilizes them in an efficient manner to achieve its goals and objectives.

To assess the district's resource management, TBG analyzed information on revenue sources, revenue and expenditure trends and their possible causes; analyzed staffing trends and their possible causes; requested data on services delivered by district staff verses third-party contractors for the last three fiscal years; analyzed equipment inventory and capital investment trends; reviewed the activities the district conducts to manage costs and plan personnel; requested information on resident feedback survey data related to finances and spending by the district; reviewed performance reviews and audits; and interviewed district staff and board members.

Current and Historic Revenues and Expenditures

Revenues and expenditures for Indian River MCD were stable and well managed, with expenditures steadily decreasing while revenues increased. Indian River MCD's funding is primarily comprised of ad valorem taxes. The Indian River County Property Appraiser, with approval from the Florida Department of Revenue, certifies the county's tax roll each year and provides the information to the Indian River County Tax Collector, which in turn collects monies authorized under the Indian River MCD's taxing authority. Millage rates are set each year by Indian River MCD's board of commissioners. Indian River MCD's fiscal year begins October 1st and ends on September 30th.

To review revenues and expenditures of Indian River MCD, TBG requested and received information from Indian River MCD from FY 2019-20 through FY 2022-23. In addition, TBG interviewed Indian River MCD staff and reviewed documentation both online and as provided from Indian River MCD accounting and operation systems.

For FY 2022-23, total revenues were estimated at $5.37 million **Table 7**, the majority of which ($5.29 million) came from ad valorem taxes and approximately $90,000 from interest earnings, equipment sales, and other miscellaneous sources. Year-to-date expenditures through April in FY 2022-23 totaled $2.58 million, the majority of which are direct program costs. Other expenditures for this year include $33,374 for depreciation.

Table 7. Revenue and Expenditures

Revenue and Expenditures (in $Mil.)	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23[1]
Revenues	**$4.78**	**$4.89**	**$5.08**	**$5.37**
Ad Valorem	$4.56	$4.80	$5.04	$5.29
Other Sources	$0.22	$0.09	$0.04	$0.09
Expenditures	**$5.00**	**$4.57**	**$4.14**	**$2.58**
Administrative Costs	$0.59	$0.59	$0.64	$0.43
Direct Program and Activity Costs	$4.41	$3.98	$3.50	$2.11
Other Expenditures	$0	$0	$0	$0.03

Source: TBG Work Product, MCD.
[1] 2023 YTD through April.

Revenues have increased from $4.78 million in FY 2019-20 to $5.37 million in FY 2022-23. Expenditures have decreased from $5 million in FY 2019-20 to $4.1 million in FY 2021-22. Through April, expenditures in FY 2022-23 were $2.58 million. Indian River MCD's expenditures were slightly greater than its revenues in FY 2019-20 but revenues have exceeded expenditures in each of the past two full fiscal years. These trends demonstrate that the district has made improvements in its resource management over the past several years. The revenues collected by Indian River MCD are sustainable given rising property values, especially as Indian River MCD expenditures between FY 2019-20 through FY 2021-22 have steadily decreased. The decline in expenditures is largely attributable to decreases in district program and activity costs, including, as shown below, decreases in direct personal services costs, direct operating expenses, administrative and direct supplies and materials, and direct capital expenses. In addition, Indian River MCD was able to lower its millage in FY 2022-23 with the rise of taxable value and the lowering of expenditures.

Administrative Costs

Administrative costs have increased by 9% from FY 2019-20 through FY 2021-22, accounting for about 13% of total expenditures on average. To assess direct program costs, TBG reviewed Indian River MCD budget information to determine categorizations for administration costs consistent with other districts. Indian River MCD provided a breakdown of total expenditures by administrative and other program costs. **Table 8** summarizes the detailed administrative cost data provided by the district. Administrative Personal Services expenditures marginally increased from $227,279 in FY 2019-20 to $245,637 in FY 2021-22, while Personal Service Benefits increased from $82,402 to $113,758 during the same period. Operating Expenses attributable to program administration rose from $42,927 in FY 2019-20 to $56,147 in 2021-22. Overall administrative costs rose from $585,281 to $640,484 between FY 2019-20 and FY 2021-22. Year-to-date expenditures in FY 2022-23 were $431,981 through April 2023.

Table 8. Administrative Cost Data

Expenditure Category[1]	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23[2]
Personal Services	$227,279	$236,995	$245,637	$182,422
Personal Service Benefits	$82,402	$99,046	$113,758	$92,429
Professional Services	$19,835	$22,192	$18,978	$20,113
Operating Expenses	$42,927	$24,220	$56,147	$41,103
Supplies and Materials	$31,875	$26,733	$24,185	$36,739
Capital Expenses	$180,963	$179,044	$181,779	$59,174
Total	**$585,281**	**$588,230**	**$640,484**	**$431,981**

Source: TBG Work Product, MCD.
[1] Categorization of administrative costs was completed by Indian River MCD based on an outline provided by TBG to ensure consistency across reports.
[2] 2023 YTD through April.

Direct Program Costs

Direct program costs have decreased by 21% from FY 2019-20 through FY 2021-22. As requested by TBG, Indian River MCD provided a breakdown of total expenditures by direct program costs, which are summarized in **Table 9**. Direct Personal Service expenditures decreased from $1.91 million in FY 2019-20 to $1.50 million in FY 2021-22 while direct Personal Service Benefits decreased by $723,494 to $692,817 during the same period. The decrease in personal services occurred due to a decrease in payroll expenses. The FY 2020-21 financial audit reports that the district had fewer employees during 2021 resulting in an approximate $300,000 decrease. Direct Operating Expenses decreased from $552,988 in FY 2019-20 to $253,081 in 2021-22. This decline was partly attributable to the change in categorization of contracted aircraft costs from this category to the professional services category, although costs for contracted aircraft did decrease overall by approximately $100,000 during the time period. In addition, the decrease in direct operating expenses was driven by decreased maintenance costs for dikes, trucks, ATVs, and boats. Another large direct expenditure category, Supplies and Materials, saw cost decreases in FY 2021-22 compared to the prior two fiscal years. This decrease was attributable to an almost 50% decrease in the cost of chemicals during the time period as the district decreased the number of types of chemicals it purchased and had a substantial decrease in costs of a particular larvicide due to below average rainfall during the prior three fiscal years and the rotation of other larvicide products utilized for mosquito control in the district. The FY 2020-21 financial audit also reports that district expenditures declined during 2021 due to the district having a lower need for chemicals because there were no hurricanes in 2021. Total direct costs fell between FY 2019-20 and FY 2021-22 by $913,383.

Table 9. Direct Program Cost Data

Expenditure Category[1]	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23[2]
Personal Services	$1,906,278	$1,691,909	$1,495,999	$801,699
Personal Service Benefits	$723,494	$706,418	$692,817	$406,201
Professional Services	$206,563	$214,154	$379,261	$395,174
Operating Expenses	$552,988	$431,780	$253,081	$220,126
Supplies and Materials	$778,150	$706,941	$545,072	$281,080
Training	$6,260	$5,076	$3,575	$9,002
Capital Expenses	$238,230	$225,140	$128,776	$0
Total	**$4,411,964**	**$3,981,418**	**$3,498,581**	**$2,113,282**

Source: TBG Work Product, MCD.
[1] Categorization of direct costs was completed by Indian River MCD based on an outline provided by TBG to ensure consistency across reports.
[2] 2023 YTD through April.

Contracts for Services

Indian River MCD contracted services is higher than other MCDs as it contracts out for aerial spraying in order to maximize the usage of its resources. TBG reviewed documentation provided by Indian River MCD to determine what services Indian River MCD contracted out for rather than conducting in house, as well as the costs for each.

Due to Indian River MCD utilizing a ground fleet based operational force, they have no in-house capability for aerial mosquito control operations. During widespread mosquito outbreaks or during a medical emergency when there exists a threat to the public of a mosquito-transmitted pathogens such as St. Louis encephalitis, West Nile or Zika, MCD contracts with a company specializing in aerial adulticide spraying for the application of Dibrom. There have been no outbreaks in the four fiscal years reviewed, so no costs have been incurred for contracted adulticide spraying. The Indian River MCD has contracted out for aerial larvicide treatments, at a total cost of $750,780 (Professional Services) over the four fiscal years under review and the remaining contracted services have been fairly stable (**Table 10**). Other contractual services include things such as temporary janitorial or uniforms services.

Table 10. Summary of Contracted Services

Expenditure Category[1]	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23[2]
Professional Services	$250,080	$166,677	$169,212	$164,811
Legal & Engineering Services	$9,808	$21,393	$5,375	$19,810
Accounting & Auditing	$19,835	$22,192	$18,978	$20,113
Other Contractual Services	$42,117	$31,261	$33,417	$47,003
Total	**$321,840**	**$241,523**	**$226,982**	**$251,737**

Source: TBG Work Product, Indian River MCD.
[1] Categorization of contracted costs was completed by Indian River MCD based on an outline provided by TBG to ensure consistency across reports.
[2] 2023 YTD through April.

Staff

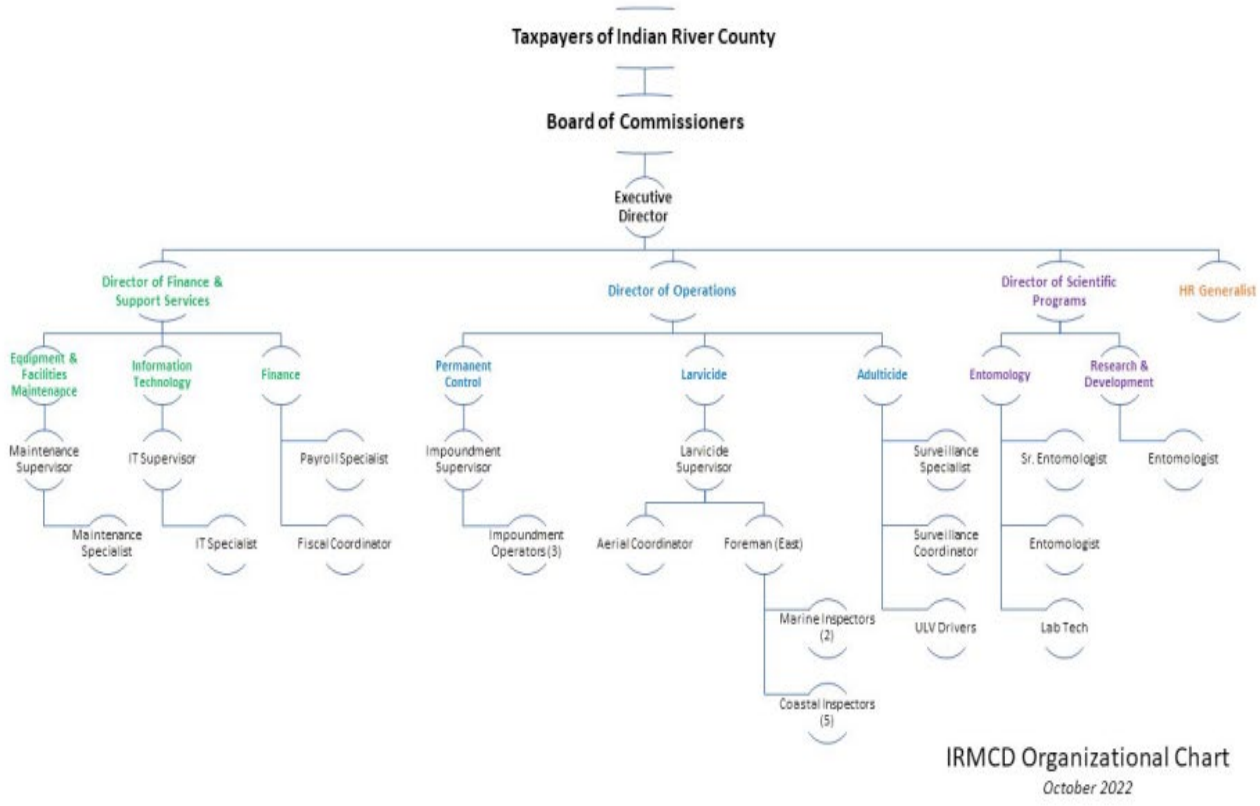
Indian River MCD employed a variety of administrative, technical, and scientific staff positions in FY 2022-23. Indian River MCD employs over 30 staff members across several types of positions requiring a wide variety of responsibilities and expertise. Indian River MCD had 31 paid staff members in FY 2022-23 across several types of positions representing a wide range of responsibilities and expertise, including management, operations, fiscal, and scientific and technical roles. Of the 31 current employees, 28 are full-time employees and three are Indian River MCD commissioners. Indian River MCD has employed part-time employees and summer interns in the past but did not report any for FY 2022-23. Paid positions are listed in **Table 11**, and an organizational chart is presented in **Figure 3.**

Table 11. Indian River MCD Staff Positions

• Commissioners • Executive Director • Director of Finance & Support Services • Maintenance Supervisor • Maintenance Specialist • IT Supervisor • IT Specialist • Payroll Specialist	• Fiscal Coordinator • Director of Operations • Impoundment Supervisor • Impoundment Operators • Larvicide Supervisor • Aerial Coordinator • Foreman (East) • Marina Inspectors • Coastal Inspectors	• Surveillance Specialist • Surveillance Coordinator • ULV Drivers • Director of Scientific Programs • Sr. Entomologist • Entomologists • Lab Tech • HR Generalist

Source: TBG Work Product, MCD.

Figure 3. Indian River MCD Organizational Chart



Source: Indian River MCD.

Analysis of Program Staffing Levels

Indian River MCD staffing levels have remained fairly stable over the current and past three fiscal years and appear to be appropriate to meet the needs given the variety of IPM activities and services the district provides. To assess program staffing levels, TBG reviewed documentation provided by Indian River MCD. The organizational

structure of Indian River MCD provides for sufficient operational division and function. The program staffing levels have remained relatively constant during the current and past three fiscal years, ranging from 34 staff in FY 2019-20 to 31 staff in FY 2022-23. The turnover rate has fluctuated between years, with at least one staff member retiring every year between FY 2019-20 and FY 2021-22. **Table 12** summarizes staff levels for the district. The district appears to have adequate staff to conduct its operations and provide services within the boundaries of the district.

Table 12. Indian River MCD Staff Counts

Employee Counts	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23[1]
Commissioners	3	3	3	3
Full Time	30	32	30	28
Part Time	1	1	2	0
Contracted	0	0	0	0
Volunteers	0	0	0	0
Vacancies	1	2	2	2
Total	**35**	**38**	**37**	**33**
Turnover Rate[2]	7%	18%	15%	0%

Source: TBG Work Product, MCD.
[1] 2023 YTD through April.
[2] Turnover rates provided by the MCD.

Equipment and Facilities

Equipment and facilities of Indian River MCD are currently sufficient for standard operations, with equipment being serviced regularly to maintain and maximize efficiency in operational capabilities. To review the equipment and facility trends of Indian River MCD, TBG analyzed documentation provided by Indian River MCD, and interviewed Indian River MCD staff.

Indian River MCD owned 30 trucks, 15 utility vehicles, and four boats in FY 2021-22 (**Table 13)**. Indian River MCD utilizes one facility location in Indian River County and seven buildings located in Vero Beach.

Table 13. District Vehicles, Equipment, and Facilities

	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23[1]
Vehicles	**40**	**46**	**49**	**50**
Airplanes	0	0	0	0
Helicopters	0	0	0	0
Boats	4	4	4	4
Trucks and Vans	27	30	30	31
Campers and Buses	0	0	0	0
ATVs and Utility Vehicles	9	12	15	15
Equipment	**202**	**215**	**268**	**269**
Field Equipment	154	166	167	168
Lab Equipment	14	15	16	16
Office Equipment	34	34	85	85
Facilities	**1**	**1**	**1**	**1**
Buildings	7	7	7	7

Source: TBG Work Product, MCD.
[1] 2023 YTD through April.

Indian River MCD also has several different types of surveillance equipment, including mosquito traps, sentinel chicken coops, and sentinel chickens. Indian River MCD has eight sentinel chicken stations placed strategically throughout the county in order to provide broad and effective monitoring. The inventory of equipment has remained constant over the current and past three fiscal years, with the exception of mosquito traps, which the district increased from nine in FY 2019-20 to 23 in FY 2020-21 (**Table 14**).

Table 14. Surveillance Equipment

Equipment	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23[1]
Mosquito Traps	9	23	23	23
Sentinel Chicken Coops	8	8	8	8
Sentinel Chickens	48	48	48	48

Source: TBG Work Product, MCD.
[1] 2023 YTD through April.

Strategic or Other Formal Plans for the District's Future

Indian River MCD has created a strategic plan outlining its goals for the five-year span of 2023-2027, with measures to account for the expansion of district operations and services. To assess the formal plans for Indian River MCD's future, TBG reviewed documentation provided by Indian River MCD to determine the full scope of Indian River MCD's strategic plan.

Indian River MCD completed a strategic planning effort, and its board approved the five-year plan on February 14, 2023. Indian River MCD published a 2023-2029 strategic plan outlining its methodology, Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis, and strategic goals and objectives to achieve in the span of the next five years. This plan details the mission, vision, core values, and goals of Indian River MCD. The plan includes a 3-phase process to achieve the desired outcomes of its strategic plan, a detailed SWOT analysis, and six strategic goals with objectives for each goal. Goals include developing a fiscally responsible and transparent budget while exploring alternative funding opportunities, developing outreach and community engagement programs, continuing an effective mosquito control program using the best innovative and scientific techniques, ensuring Indian River MCD is conducting safe and ecologically mindful best integrated pest management practices and techniques, investing in the professional development of employees, and embracing environmental challenges.

Previous Performance Reviews, Financial Audits, and Resident Feedback Surveys

Indian River MCD had findings in financial audit reviews, and corrections were expediently made. Indian River MCD audits report no material findings nor weakness in internal controls. No performance reviews have been done. Analysis of Indian River MCD's financial audits was conducted with financial audits provided by Indian River MCD.

The audits of Indian River MCD's financial statements from FY 2018-19 found an uncorrected issue from the FY 2017-18 audit related to journal entries in which an amount recorded for chemical inventory did not align with the annual inventory report. This finding was corrected by FY 2019-20 to ensure that all journal entries are reviewed by someone other than the preparer, performed in sufficient detail to identify and correct errors, and retain sufficient evidence to determine the review occurred. The FY 2019-20 audit reported a new finding related

to the inventory and capital assets of a chemical donation by a vendor that was initially misfiled; this finding was corrected in the FY 2020-21 audit, which did not identify any additional findings.

Analysis of Management Reports/Data and Performance Information

Indian River MCD has not yet actively managed performance success or failure of its operations and administration against goals, and does not currently have effective reporting mechanisms in place to measure results on a timely basis. To assess management reporting and performance information, TBG reviewed documentation provided by Indian River MCD, interviewed staff, and reviewed online documentation. Indian River MCD recently developed a new strategic plan detailing goals and clear objectives and associated timelines for expected completion. This plan has not been in place long enough for Indian River MCD to make significant progress toward these goals.

Evaluation of Cost, Timing, and Quality of Current Program Efforts

Successful ongoing program efforts, recent financial management improvements, and the recent formalization of goals and performance objectives indicate that Indian River MCD is managing program costs and quality effectively and efficiently. To assess cost, timing, and quality of program efforts, TBG reviewed documentation provided by Indian River MCD and publicly available data and reports. Indian River MCD is a well-run, effective, and efficient operation and its Rotational Impoundment Management (RIM) operations are a unique example of effective mosquito control in vast coastal, environmentally sensitive areas and serve as a model for nearby coastal counties that also employ impoundments (e.g., Brevard, St. Lucie, and Martin). As the district's operations and programs are time-tested (with no locally acquired arboviruses), Indian River MCD's focus has been to (1) build its reserve for capital improvements contemplated by its strategic plan and (2) increase efficiency as measured by the time for responses to calls, the level of community outreach, and the readiness of staff via training.

The development of a new strategic plan gives Indian River MCD direction and objective measures to work towards in the future, and the strategic plan includes objectives to meet an overarching goal of achieving sustainable funding sources and controlling its costs. While previous audits identified issues, they were immediately rectified by Indian River MCD's management. Historical revenues and expenditures show that Indian River MCD is able to operate within budget, was able to lower millage rates, and has consistently decreased its costs during each year of the review period.

Goals, Objectives, and Performance Measures and Standards

Indian River MCD has new, clearly stated goals and objectives that are measurable and appropriate to address the district's purpose; the district has kept arbovirus case counts at zero in the current and past three calendar years but lacks measurable performance standards with which to assess how well it meets its newly defined goals and objectives.

To assess the district's goals, objectives, performance standards, and performance measures, TBG requested and reviewed the district's charter; requested and reviewed the district's strategic plan and the last three years of annual reports; requested information on performance measures and standards and records of current and previous three fiscal years' measures, standards, and records of success or failure to meet the standards. TBG

assessed whether performance measures and standards are relevant, useful, and sufficient to evaluate the performance and costs of the programs and activities. TBG requested any previous performance reviews and audits; requested district assessments of why (if applicable) the district failed to meet performance measures and standards and/or goals and objectives; and requested information from the district on actions taken to address and prevent such failures in the future. In addition, TBG interviewed district staff and relevant local government entities about district performance and requested any available results of district-generated resident feedback surveys conducted during the current and previous three fiscal years

Goals and Objectives

Indian River MCD has clearly stated goals and objectives across six district priority areas detailed in the strategic plan. The detailed list of goals and objectives reflects the district's operations and they are presented in **Table 15**.

Table 15. Goals and Objectives

Goals	Objectives
Achieve Sustainable Funding Sources	Post draft and final budget on website Develop reserve fund balance policy Develop a 5-year Capital Improvement Plan & present to board Create review process for alternative funding sources
Outreach & Community Engagement	Schedule two/three outreach events Develop job description for public relations position & cost, present with budget Develop Communications Plan Assess effectiveness of outreach events on a quarterly basis
Effective Mosquito Control Using Innovation and Scientific Techniques	Respond to service requests within two business days Assess efficacy & efficiency of treatments Testing & evaluation of products on semi-annual basis Develop plan to expand larviciding to western portions of district
Safe & Ecologically Minded Best Management Practices & Techniques	Review product labels and safety data sheets on monthly basis and report findings to Executive Director Conduct quarterly safety committee meetings Ensure all staff are licensed Conduct annual calibration of equipment Annually report chemical usage to U.S. Fish and Wildlife Service National Wildlife Refuges
Invest in Professional Development of Employees	Conduct compensation and benefits study and submit to board for approval Conduct quarterly market analysis of compensation and report findings to the Executive Director Spill response team to attend annual training to maintain certification Professional staff to continue involvement in professional associations & provide presentations at scientific meetings

Goals	Objectives
	Recommend training opportunities for staff's career development for budget considerations Review positions and advise of list of eligible retirees & critical positions for succession planning
Embracing Environmental Challenges using Sound Science & Strong Partnerships	Two members Permanent Control staff will be trained and licensed in Natural Areas Collaborate with Indian River Land Trust in evaluating drawdowns and effects of juvenile fish populations Establish contract for water quality monitoring of impoundments Develop & implement a water quality monitoring plan for impoundments Establish a list of current & potential environmental/ecological partners to develop working relationships with the district

Source: Indian River MCD.

The problems addressed by the district's goals and objectives relate to developing effective, safe, and ecologically-minded mosquito control practices and finding sustainable funding sources for those activities. The district's goals also address environmental challenges of controlling mosquito populations in environmentally sensitive areas and protecting human well-being. To reduce the use of harsher adulticides, Indian River MCD concentrates on eliminating larval aquatic breeding habitats to prevent their emergence into the environment altogether. In addition, larvicides used by Indian River MCD do not pose unreasonable risks to human health according to the EPA. Indian River MCD works with government bodies to achieve control on state and federal properties while not impacting protected resources. Indian River MCD also uses advanced research and technology methods to maximize the effectiveness of its treatments and eliminate any product waste.

The expected benefits of the districts goals and objectives are reducing mosquito populations in order to prevent disease, including serious illnesses like St. Louis encephalitis (SLE), West Nile virus (WNV), and Eastern Equine encephalitis (EEE). The general public good is also improved with the reduction of nuisance populations of mosquitoes.

Performance Measures and Standards

Indian River MCD has recently developed goals and objectives but does not yet have formal performance measures and standards associated with each goal and objective; the district does maintain and track arbovirus prevalence for human cases detected in the district. The district does not have formally established performance measures and standards associated with its recently established goals and objectives, but it does monitor disease prevalence. The district also reported monitoring district responses to service calls, but did not provide data on the number of responses. TBG determined that the measures and standards for these activities are as follows.

1. **Standard:** Zero human cases or deaths related to arboviruses acquired in Florida and detected in the district.

   Measure: Counts of arbovirus cases in humans as reported by DOH data.

2. **Standard:** Respond to all service calls in a timely manner.

   Measure: Number of service calls received via telephone or the district's website that are answered in a timely manner.

Analysis of Goals, Objectives, and Performance Measures

Indian River MCD recently developed a five-year strategic plan and defined clear, measurable goals and objectives that are appropriate for the scale and scope of its operations but currently lacks performance standards and measures for those goals and objectives; it has kept arbovirus case counts at zero in the current and past three calendar years. Indian River MCD recently conducted a strategic planning process through which it developed clear, measurable goals and objectives as described in the earlier. The district could further define performance standards and measures that it could use to monitor how well it achieves its goals and objectives going forward. Currently, the district monitors performance through arbovirus counts and responses to service calls.

Indian River MCD's goals show capacity to grow in operations scale as needed to accommodate growth in resident population. Due to the effective monitoring and treatments, there have been no arbovirus cases in humans during the current and previous three calendar years. Only one travel-related case of dengue fever was detected in the district. The district reported that it has received over 1,000 service calls in each of the past three fiscal years but did not report data on how many calls to which the district responded.

Table 16 reports the district's disease prevalence for the referenced calendar years and service delivery metrics for the referenced fiscal years.

Table 16. Performance Measures for Indian River MCD

Performance Measure	CY 2020[1]	CY 2021[1]	CY 2022[1]	CY 2023[1]
Arbovirus Cases (Florida)	0	0	0	0
Arbovirus Cases (Travel)	0	0	1	0
Arbovirus Deaths	0	0	0	0
	FY 2019-20	**FY 2020-21**	**FY 2021-22**	**FY 2022-23[2]**
Service Calls	1,047	1,507	1,155	638
Service Responses	Unknown	Unknown	Unknown	Unknown

Source: TBG Work Product, Indian River County MCD, DOH.
[1] CY 2023 data is for January through April 2023; Florida DOH data is provided by calendar year (CY), rather than fiscal year.
[2] Service calls through February 2023.

Table 17 shows the single performance measure and standard for Indian River MCD.

Table 17. Assessment of Performance Measures and Standards for Indian River MCD

Performance Measure	Performance Standard	Assessment
Annual counts of mosquito-borne diseases for the current and past three calendar years	No human cases of arbovirus acquired in Florida and detected in the district	Standard met.
Number of service requests received via telephone or the district's website that are answered in a timely manner	Respond to all service requests in a timely manner	Indeterminate due to lack of data.

Source: TBG Work Product, based on review of information provided by Indian River MCD.

Perceptions of the District's Performance by Local Government Stakeholders, Residents, and Other Relevant Local Stakeholders

Perceptions of Indian River MCD's performance is positive based on limited feedback. TBG reviewed stakeholder letters provided by Indian River MCD as well as feedback from the BOCC. Indian River MCD provided only two letters representing stakeholder feedback during the review period. These two letters contain positive stakeholder feedback related to professionalism, responsiveness, and operations. However, the Chair of the BOCC indicated that consolidation of the district with the county should be explored. The chair believes incorporating the district within the county budget would be more cost-effective, increase accountability for the operations, and increase transparency for the taxpayers. TBG requested information from local health departments and local parks and recreation units to assess their perceptions of the district's delivery of services. TBG received a response from a representative of the local parks and recreation department but the response did not contain substantive feedback. TBG did not receive a response from the local health department following multiple contact attempts.

3. Recommendations

Discussion and Analysis

TBG analyzed findings by fiscal year to determine if revisions to district organization or administration can improve the efficiency, effectiveness, and/or economical operation of the district and presents two recommendations. TBG presents recommendations to the district for the development of additional performance measures and standards with which to monitor progress towards goals and objectives and to the Legislature for the consideration of a statutory amendment to direct the Florida Coordinating Council on Mosquito Control to develop model goals, objectives, and performance measures and standards to assist MCDs in this state with performance measurement.

Performance Standards and Measures: Indian River MCD has developed a formal strategic plan with clear goals and objectives, but has not developed formal performance measures and standards tied to each district goal and objective. The district could establish clearly defined performance standards and metrics with which to assess its progress towards achieving its goals and objectives.

Florida Coordinating Council on Mosquito Control: During TBG's review of the 15 independent MCDs, TBG found that most districts have not developed sufficient goals, objectives, or performance measures and standards. The Florida Coordinating Council on Mosquito Control was established by the Legislature to foster maximum efficient

use of existing resources and to assist entities involved in mosquito control with best management practices. Membership on the council includes the agency heads for DACS, DEP, and FWC, the State Surgeon General, as well as representatives of federal agencies, the University of Florida's Florida Medical Entomology Laboratory, Florida MCDs, and others. The Legislature could direct the council to form a subcommittee consisting of mosquito professionals and researchers from around the state to develop model MCD goals, objectives, and performance standards and measures to assist MCDs with performance monitoring.[5]

Recommendations

Table 18 summarizes recommendations for Indian River MCD.

Table 18. Recommendations with Associated Considerations

Recommendation	Considerations
The district could formalize additional performance standards and measures that would allow the district to monitor and track progress towards all of its goals and objectives. Such performance information would facilitate the district in consistently monitoring its progress.	• This recommendation would require additional staff time and may result in additional administrative costs to the district.
The Legislature could consider amending s. 388.46*, Florida Statutes*, to direct the Florida Coordinating Council on Mosquito Control to form a subcommittee consisting of mosquito professionals and researchers from around the state to develop model goals, objectives, and performance measures and standards to assist MCDs with performance monitoring.	• This recommendation would require a statutory change. • This recommendation would impose additional workload on council members and staff. • The council's membership could assemble subcommittee with a broad range of expertise that could be ideal for the development of such model performance information. • While this guidance will assist all MCDs, it will be of particular benefit to MCDs that lack staff resources for the development of such performance information.

Source: TBG Work Product, based on review of information provided by Indian River MCD.

[5] Section 388.46, *F.S.*

4. District Response

In response to the corrections of fact pointed out in the district response letter that is provided on the following two pages, TBG made the following edits to the report.

1. On page 5, TBG edited the abbreviation for the St. Johns River Water Management District.
2. On page 5, TBG changed the number of facilities to equal one and the number of buildings to equal seven in Table 5 and in the text that precedes the table.
3. On page 8, TBG added the term “managing impoundments” to the “Source Reduction” section of Table 6.
4. On page 11, TBG edited the statement regarding the decrease in direct chemical costs to read “…had a substantial decrease in purchases of a particular larvicide due to the below average rainfall during the prior three fiscal years and the rotation of other larvicide products utilized for mosquito control in the district.”
5. On page 14, TBG changed the number of facilities to equal one and the number of buildings to equal seven in Table 13 and in the text that precedes the table.
6. TBG deleted text on page 16 that was not applicable to the district.

Regarding the comments relating to page 10 of the response letter, Table 7 states that the data on revenues and expenditures was based on information from the district and as provided from the district’s accounting and operation systems.

Indian River Mosquito Control District

Commissioner Janice Broda ♦ Commissioner Matt Erpenbeck ♦ Commissioner Anna Kirkland
Sherry Burroughs, Executive Director
5655 41st Street, Vero Beach, FL 32967 ♦ Phone: 772.562.2393
http://irmosquito.com ♦ irmcd@irmosquito2.org

August 24, 2023 (*via email*)

Valerie Seidel, President
The Balmoral Group
165 Lincoln Avenue
Winter Park, FL 32789

Subject: Indian River MCD Review Draft Report

Dear Ms. Seidel,

Thank you for the opportunity to provide comments on the final draft report. The District agrees with the findings within the draft report, and we are looking forward to consulting with representatives to assist in further defining performance standards and measures to assess the progress with our goals and objectives. We would like to note the following editorial comments in the report.

Page 5 – Intergovernmental Interactions
The abbreviation for St. Johns River Water Management District should be reflected as "SJRWMD" and for consistency DACS should be noted as the "Florida Department of Agriculture & Consumer Services (DACS)."

Page 8 – Table 6. Indian River MCD Services Overview – Source Reduction
Please add "managing impoundments" as a source reduction service the District provides.

Page 10 – Table 7. Revenue and Expenditures
Should note that financial revenue and expenditure data is based on fiscal year accounting software reporting. Revenue and expenditure totals may vary from audited financial statements.

Page 11 – Direct Program Costs
A statement was made as to the reason for the substantial decrease in the costs of the particular larvicide, which we feel is not accurate. We suggest that the language be modified to reflect "...had a substantial decrease in costs of particular larvicide (Vectobac), which may be attributable to the below average rainfall (60.41 inches in 2019-2020, 51.37 inches in 2020-2021, and 42.22 in 2021-2022) received during the subsequent years and the rotation of larvicide products utilized for control".

Page 14 – Table 13. District Vehicles, Equipment and Facilities
The number of facilities should be only one and the number of buildings should be seven. We have noted this before on the spreadsheet, but it has not been corrected. It appears that the numbers were obtained by counting the items in the asset inventory list by sorting by "Building_Land." However, capital projects, such as the addition of hurricane shutters on the building is listed as one of the items as it is an improvement to the building, but it is not a structure and therefore should not be counted as such.

Page 16 – Evaluation of Cost, Timing and Quality of Current Program Efforts
The second and third paragraphs did not appear to specifically relate to our District. Although we do monitor and perform insect resistance testing of specific chemicals, we are not utilizing sterile insect technology and we have

not customized vehicles for adulticide treatments in the manner to which the document indicates. We also do not currently conduct in-house lab testing but are looking to perform such in the near future.

Thank you again for the opportunity to comment on the report.

Sincerely,

Sherry Burroughs
Executive Director

Attachment 1

GLOSSARY OF TERMS
MOSQUITO CONTROL DISTRICT REVIEWS

September 2023

Prepared for

The Florida Legislature

Prepared by

The Balmoral Group

165 Lincoln Avenue

Winter Park, FL 32789

Attachment 1

Term	Definition
Adulticide	A chemical that kills adult insects, which is usually applied as a spray; depending on the circumstances, adulticide applications can be made from the ground (most commonly with ultra-low volume spray trucks) or from the air (with either fixed- or rotary-wing aircraft or helicopters)
***Aedes aegypti* mosquitoes**	The primary type of mosquitoes (commonly referred to as yellow fever mosquitoes) that spread Zika, dengue, chikungunya, and other viruses; because these mosquitoes live near and prefer to feed on humans, they are more likely to spread these viruses to humans than other types of mosquitoes
***Aedes albopictus* mosquitoes**	Although competent vectors of dengue, eastern equine encephalitis, and other viruses that affect humans, these mosquitoes (commonly referred to as Asian tiger mosquitoes) feed on animals as well as humans and are, thus, less likely to spread viruses to humans than *Aedes aegypti* mosquitoes
Altosid	The trade name for a mosquito larvicide that contains a synthetic version of the juvenile hormone insect growth regulator methoprene as the active ingredient
American Mosquito Control Association (AMCA)	A professional association that includes individuals working for mosquito control programs, academics conducting research on mosquitoes and other disease vectors, and industry representatives who support mosquito control efforts around the world; the AMCA is active in member training and educating the public on the health importance of mosquito control in the U.S. and beyond; the association is international in scope and has approximately 1,500 members
***Anopheles* mosquitoes**	A genus of mosquitoes with more than 400 species; female mosquitoes in approximately 40 of these species transmit malaria; this is the only genus of mosquitoes that can transmit malaria
Arbovirus	Arthropod-borne viruses that are transmitted to humans primarily through the bites of infected mosquitoes, ticks, sand flies, or midges; includes West Nile virus, eastern equine encephalitis virus, St. Louis encephalitis virus, dengue, chikungunya, Zika, California encephalitis group viruses, and malaria
Arthropod	As defined in Ch. 388, *Florida Statutes*, titled "Mosquito Control," "arthropods" are insects of public health or nuisance importance, including all mosquitoes, midges, sand flies, dog flies, yellow flies, and house flies

Term	Definition
Barrier island	Land that separates the ocean from the mainland; frequently an estuary or a lagoon will be located between the barrier island and mainland
Biogents	A company that produces mosquito traps with the goal of reducing mosquito populations that are produced in container-type habitats
***Bacillus thuringiensis israelensis* (*Bti*)**	A naturally occurring bacteria commonly used as a mosquito larvicide since the 1980s
Chikungunya	A mosquito-transmitted disease caused by a virus that originated in Africa and is transmitted by *Aedes* mosquitoes; symptoms include fever, joint pain, and rash; the name chikungunya comes from the African Makonde language and means "to bend over in pain," which is the stance that many who contract this disease exhibit
***Culex* mosquitoes**	A genus of mosquitoes, several species of which serve as vectors of one or more important diseases of birds, humans, and other animals; the diseases they vector include West Nile virus, Japanese encephalitis, and St. Louis encephalitis.
***Culiseta melanura* mosquitoes**	A species of mosquitoes (commonly referred to as the black-tailed mosquito) that is significant due to its role in the transmission cycle of eastern equine encephalitis virus and potentially West Nile virus; these mosquitoes primarily feed on birds but can spread arboviruses to mammals as well
Dengue	A mosquito-transmitted virus that causes sudden fever and acute joint pain; occasionally occurs in Florida where the mosquito vector is *Aedes aegypti* or *Aedes albopictus*
Dibrom	The trade name for an organophosphate insecticide with the active ingredient naled; used in mosquito control as an adulticide and is typically applied with aircraft
Dipper	An approximately 300 ml container attached to an extension pole that is used to sample for the presence of mosquito larvae in aquatic habitats
Eastern equine encephalitis virus (EEEV)	A mosquito-transmitted virus that is rare but very dangerous when contracted by a horse, human, or other mammal; an average of 13 cases per year were reported in the United States from 2018-2022; approximately 30% of people with EEEV die and many survivors have ongoing neurologic

Term	Definition
	problems; in Florida, the freshwater swamp inhabiting mosquito *Culiseta melanura* is the primary vector of this disease
Fixed-wing aircraft	Commonly referred to as an airplane, these aircraft include stationary wings that provide lift for the aircraft; in mosquito control, these aircraft are commonly used for larvicide and adulticide applications
Florida Coordinating Council on Mosquito Control	An interagency council created in Ch. 388, *Florida Statutes,* in 1986, primarily to address issues concerning mosquito control applications, possible environmental impacts of control actions, and mosquito control management on State of Florida-owned lands
Florida Department of Agriculture and Consumer Services	The state agency that oversees and regulates mosquito control programs in Florida
Florida Department of Environmental Protection	The state agency responsible for coordinating efforts for intensified mosquito control on protected public lands when needed
Florida Department of Health (DOH)	The state agency responsible for implementing the Florida Sentinel Chicken Surveillance Program, reporting weekly data on the prevalence of arboviruses in this state, issuing public health arbovirus advisories and alerts, conducting or participating in arbovirus epidemiologic investigations, distributing weekly arbovirus epidemiology summary reports for mosquito control agencies, healthcare agencies, researchers, and others, and reporting human and animal arbovirus cases to the national arbovirus surveillance database
Florida Fish and Wildlife Conservation Commission	The state agency responsible for maintaining a database that enables the surveillance of bird mortality from arboviruses and for providing assistance and information on arboviruses in wildlife
Florida Medical Entomology Laboratory	A University of Florida laboratory (within the Institute of Food & Agricultural Sciences) that conducts research primarily on the control of mosquitoes; for the past 70 years, research at this lab has been instrumental in assisting mosquito control programs in Florida and elsewhere
Florida Mosquito Control Association (FMCA)	Created in the 1920s, the FMCA is Florida's professional association that includes individuals working for mosquito control programs, academic personnel conducting research on mosquitoes and other disease vectors,

Term	Definition
	and industry, which supports mosquito control efforts in Florida; the FMCA is active in the training of members and educating the public on the public health importance of mosquito control
Florida Sentinel Chicken Arboviral Surveillance Program	A program of the DOH that provides laboratory assistance to local agencies to monitor for the transmission of mosquito-transmitted viruses; sentinel chickens are stationed at locations throughout the state; when the chicken is bit by an arbovirus-transmitting mosquito, the chicken develops antibodies to the virus (the chicken does not become sick and cannot spread the virus to other mosquitoes); blood samples obtained from the sentinel chickens are submitted to DOH's lab in Tampa to be examined for the presence of antibodies; when present, the results indicate that arbovirus-transmitting mosquitoes are circulating in the location, enabling the increase of mosquito control efforts to reduce the risk of humans and animals from becoming ill
Genetically modified mosquitoes	*Ae. aegypti* mosquitoes that have been genetically modified to carry two genes: 1) a self-limiting gene that prevents female mosquito offspring from surviving to adulthood; and 2) a fluorescent marker gene that glows under a special red light, thereby allowing researchers to identify the genetically modified mosquitoes in the wild; because the female offspring die before becoming adults, the population of *Ae. aegypti* mosquitoes decreases
Geographic Information System (GIS)	Integrated computer hardware and software that stores, manages, analyzes, and visualizes geographic information
Good Laboratory Practices Program (GLP)	The goal of GLP is to ensure the quality and integrity of test data related to non-clinical safety studies
Granular application	Granular applications of chemicals differ from liquid applications by having a solid particle carrying the insecticide, which can better penetrate vegetation; this application is primarily used for larvicides to deliver mosquito toxin to the water where mosquito larvae are developing
Impoundment	Impoundments along Florida's central-east coast were created in the 1950s and 1960s by building earthen dikes around salt marshes known to produce mosquitoes; this allows the mosquito control program to manage the water level within the impoundment to prevent saltmarsh mosquitoes from laying

Term	Definition
	their eggs in these areas, thus effectively reducing their populations with a minimum need for pesticides; approximately 40,000 acres of impoundments were constructed from Volusia County south to Martin County; the impoundments remain a source reduction control method in the region
Landing rates	A surveillance method to determine the extent of a mosquito problem, where a person stands in a specific location and counts the number of mosquitoes that land on them within a designated period (such as 60 seconds)
Larvicide	A chemical that kills insects in their larval stages; for mosquitoes, larvicide must be introduced into the water where the larvae are developing; depending on the circumstances, larvicide applications can be made from the ground or from the air with either fixed- or rotary-wing aircraft or drones
Light Detection and Ranging (LiDAR)	A remote sensing technology used to precisely detect objects, such as mosquitoes, in real space
Malaria	A life-threatening illness transmitted primarily in tropical locations by female mosquitoes in the genus *Anopheles* primarily in tropical locations; symptoms include fever, headache, and chills and usually occur within 10-15 days after a bite
Methoprene	A synthetic juvenile hormone, which is an insect growth regulator, that has been used as a larvicide since the mid-1970s
Millage	A tax rate on property expressed as the number of dollars assessed for each $1000 of property value; for example, the property owner of a house valued at $250,000, which is assessed at a millage rate of 1.0, would be charged $250
Mosquito Control District	A local government entity enabled through a voter-approved local or state legislative act to provide mosquito control services in a geographically defined area
Mosquito counts	Surveillance of mosquito populations using a variety of techniques (*e.g.*, traps or landing rates); this term is usually used in reference to adult mosquitoes rather than immature ones
Natular	The trade name for a larvicide that includes the bacteria spinosid as its active ingredient

Term	Definition
Nuisance mosquito	A term used to designate a mosquito that typically does not transmit a pathogen such as a virus; these mosquitoes are in contrast to disease-transmitting mosquitoes that are readily capable of transmitting a pathogen
Pest resistance	The situation in which mosquitoes are no longer killed by the standard dose of an insecticide or manage to avoid coming into contact with the insecticide
Pyrethrum	A biochemical derived from a chrysanthemum plant that contains insecticidal properties; typically used in mosquito control as an adulticide
Rotary-wing aircraft	Aircraft that use a rotary blade rather than wings; a helicopter is the most common example
Rotational impoundment management	A management technique common in saltmarsh impoundments along Florida's Indian River Lagoon where the impoundment is artificially flooded during part of the spring and summer to prevent mosquitoes from laying their eggs in the marsh and is opened for the remainder of the year through culvert pipes to provide a hydrological connection between the impounded marsh and adjacent estuary or lagoon
Saint Louis encephalitis virus	A virus most commonly transmitted by *Culex* mosquitoes that can affect the central nervous system when a human is infected
Source reduction	Refers to the elimination of habitats that can produce mosquitoes; ranges from the proper disposal of waste containers to the complicated management of impoundments
Spinosid	A naturally occurring bacteria that contains insecticidal properties; is commonly applied as a larvicide; Natular is a commercial product that uses spinosid as its active ingredient
Sterile Insect Technique	A method whereby male insects are sterilized by radiation or other means; when the sterilized male mates with the female insect, viable offspring are not produced
Subcommittee on Managed Marshes	An interagency committee created in 1986 by the Florida Legislature in Ch. 388, *Florida Statutes,* to promote the wise management of Florida's wetlands for the mutual benefit of mosquito control and environmental enhancement
Ultra-low volume	A technique to dispense extremely small droplets of insecticide; while historically used for adulticiding, in some instances the technique is now used for larviciding

Term	Definition
United States Department of Agriculture (USDA)	Through its national Agricultural Research Service, the USDA participates in Florida mosquito control efforts largely with the Center for Medical, Agricultural and Veterinary Entomology, a laboratory in Gainesville, Florida, that conducts research on the biology and control of mosquitoes and other insects
United States Environmental Protection Agency	The federal agency that regulates mosquito control in Florida primarily through their approval and enforcement of chemical labels for insecticides
Unmanned Aerial System (UAS)	Aerial vehicles and associated equipment that do not carry a human operator and are remotely piloted or fly autonomously; drones are an example of a UAS
Vector	A living organism that transmits a pathogen (*e.g.*, virus, plasmodium, nematode) from an infected animal to a human or another animal; mosquitoes are an example of a vector
Vector surveillance	Monitoring for vectors that can be accomplished in several ways (e.g., various types of traps or landing rates)
Waste tires	Vehicle tires that are no longer of value and that have been improperly disposed in a manner that allows water to collect in the tires; some species of mosquitoes (e.g., *Aedes aeypti* or *Aedes albopictus*) lay their eggs in the standing water where the immature mosquitoes will develop to adulthood
Water management	In mosquito control, this term refers to a source reduction technique to minimize the production of mosquitoes in a particular aquatic habitat; the management of saltmarsh impoundments and some ditches are examples of water management projects
West Nile virus (WNV)	Introduced into the United States in New York around 2000, the virus is carried by birds and primarily transmitted by *Culex* mosquitoes; humans who contract the virus can develop a fever and other symptoms including headache, body aches, joint pains, and rash; most recover completely but symptoms can linger for weeks to months
Yellow fly trap	A sticky-type trap used to entangle yellow flies, a type of biting fly that occurs regularly in the Florida Panhandle, to reduce their population without insecticides

Term	Definition
Zika virus	A virus that originated in the Zika region of Africa and is transmitted by the mosquitoes *Aedes aegypti* and *Aedes albopictus;* humans who contract the virus can have symptoms similar to dengue such as fever, rash, headache, and joint pain; Zika passed from a pregnant woman to her fetus can result in birth defects including microcephaly and other brain abnormalities

Source: TBG work product.

Attachment 2

INTEGRATED PEST MANAGEMENT SUMMARY

September 2023

Prepared for

The Florida Legislature

Prepared by

The Balmoral Group

165 Lincoln Avenue

Winter Park, FL 32789

Attachment 2

Term	Summary
Integrated Pest Management	Most mosquito control programs use an Integrated Pest Management (IPM) approach to control mosquito populations, which targets the different stages of a mosquito's life cycle with various prevention and control measures. IPM addresses eight areas. Surveillance of mosquito populations is an essential component of all IPM programs with chemical treatments based on the surveillance findings. IPM can also include source reduction (e.g., container disposal and water/impoundment management), larviciding and adulticiding (using ground and/or aerial treatments), biological and alternative controls, and disease surveillance. Research and education are also important components of IPM programs.
Mosquito Surveillance	The general approach to surveillance is to define area-specific problems with mosquitoes through the establishment of a mosquito surveillance program. The program assists in determining the types of mosquito control efforts needed in each area so that pesticide applications are used only when necessary. Service requests made to mosquito control programs serve as one means of surveillance. Other means for adult mosquito surveillance include monitoring the landing rates and counts of mosquitoes in traps to determine when and where they are most prevalent and observing the effects of adulticide, larvicide, and source reduction efforts. Immature mosquito surveillance is conducted by collecting eggs, larvae, and pupae. Surveillance may also include inventorying and mapping data and using emerging technologies such as geo-referenced maps, geographic information systems (GIS), smart traps (e.g., a trap with an electronic device that differentiates mosquitoes from other insects, counts them, and wirelessly transmits the results), and unmanned aerial vehicles.
Source Reduction	Source reduction, also known as physical or permanent control, is considered the most effective mosquito control technique and is accomplished by eliminating larval habitats in salt marshes, freshwater habitats, temporarily flooded locations, and containers. Current saltmarsh source reduction techniques in Florida include • construction of shallow ditches that enhance drainage and thus eliminate mosquito-producing sites and create connectivity among water bodies to allow larvivorous fish (fish that feed upon insect larvae) access to mosquito habitats; and • management of impoundments by maintaining a sheet of water across a saltmarsh to prevent mosquitoes from laying eggs on the soil; this achieves saltmarsh mosquito control with minimum insecticide use.

Term	Summary
	Source reduction is also conducted in freshwater habitats and is based on the principle that manipulating water levels in low-lying areas will eliminate or reduce the need for insecticide use. The primary strategy used is reducing the amount of standing water or reducing the length of time that water can stand in low areas following significant rainfall. Another important area of source reduction is through aquatic plant management, which can be accomplished using chemical, biological, or mechanical control methods. Waste tire management is also a significant activity for many mosquito control districts because the proliferation and accumulation of discarded tires throughout the state continues to create habitats highly favored by mosquitoes, and these tires can be costly and labor-intensive to remove. Removing any receptacles that can contain water is beneficial in controlling mosquitoes.
Larvicides and Larviciding	Larvicides are insecticides used to kill insects in the larval stage. Most mosquitoes spend three to five days of their life cycle in the larval stage when they are highly susceptible to predation and control efforts; therefore, well-planned and timed larviciding is important for efficient operations to save labor costs and reduce chemical use. This also requires understanding the local mosquito ecology and patterns of arbovirus transmission to select the appropriate control techniques. Equipment used for ground application of larvicide can include trucks with sprayers mounted on the front bumper, all-terrain vehicles (ATVs), boats, and various hand-held and backpack sprayers. Aerial application uses various devices such as nozzles and metered systems that are attached to fixed-wing or rotary-wing aircraft (i.e., helicopters).
Adulticides and Adulticiding	Adulticides are insecticides used to kill adult mosquitoes. The majority of adulticiding in Florida is conducted using ultra-low volume (ULV) spraying during which an aerosol spray is released by specialized spray equipment mounted in aircraft, on the back of trucks or ATVs, or carried by hand or in a backpack. The spray drifts through the air and is effective only while it remains airborne; thus, having a short-term effect only. Where a longer-term effect is needed, residual sprays are applied to barriers or surfaces such as a stadium, park, or resident's yard and are often applied with a modified vehicle-mounted hydraulic sprayer. The mosquito must land on the surface where the residual insecticide has been deposited for it to be effective. Equipment operators must be properly trained in equipment maintenance and adulticide application because timing, targets, and thresholds for the application are based on numerous factors and can be challenging to establish.

Term	Summary
Biological and Alternative Control	Biological control agents include microbial control agents (e.g., bacteria, such as *Bacillus thuringiensis* or *Bt*, that can be sprayed over waterbodies to kill developing mosquito larvae), invertebrate arthropod mosquito predators (e.g., small aquatic crustaceans, such as copepods, that eat insect larvae), and vertebrate mosquito predators (e.g., larvivorous fish and birds). It is common for mosquito control districts in Florida to provide larvivorous fish as a service to the public. For example, Collier Mosquito Control District provides Gambusia mosquitofish to Collier County residents to release in standing water on their property to manage mosquito larvae. Alternative control methods include the sterile insect technique, trapping, repellents, and bug zappers.
Disease surveillance	Because of its geographic location and proximity to the Caribbean, Florida is vulnerable to the introduction of new vector-borne pathogens as occurred with the introduction of Zika virus in 2016 in South Florida. Disease surveillance includes monitoring for human cases of mosquito-borne arboviral diseases including dengue, chikungunya, West Nile virus, St. Louis encephalitis, and others. In addition, many mosquito control programs conduct regular blood testing of sentinel chickens. The state established the Florida Sentinel Chicken Arboviral Surveillance Program (FSCASP) in 1977 to provide laboratory services to local agencies to monitor the transmission of certain vector-borne diseases. The services are primarily used by mosquito control programs around the state. The programs submit sentinel chicken blood samples to the Florida Department of Health's Bureau of Laboratories in Tampa, where an antibody test is performed to identify if the chicken has been exposed to one of several viruses. Results are provided to participating agencies on a weekly basis.
Mosquito Control Research	Mosquito control programs must base their activities on sound and up-to-date scientific research in order to provide safe, effective, and efficient mosquito control services. Research that is either conducted or reviewed by mosquito control programs is essential to developing and implementing new and innovative methods and technologies. Numerous federal, state, and other entities conduct mosquito control research, as do several mosquito control districts in this state.
Outreach and Education	Increasing the public's understanding of the work of the mosquito control districts is an important component of overall mosquito control efforts. Public education helps people understand what is involved in mosquito control, the biology of mosquitoes, ecological issues, arboviral disease transmission, and actions that can be taken to prevent mosquito bites and reduce mosquitoes in yards and

Term	Summary
	neighborhoods. When adequately informed, the public is in a better position to protect themselves and support mosquito control efforts. This state's mosquito control programs and other entities, such as the Florida Department of Agriculture and Consumer Services, Florida Mosquito Control Association, and the University of Florida's, Institute of Food and Agricultural Sciences-Florida Medical Entomology Laboratory, dedicate significant efforts toward education.

Source: TBG work product.