

**St. Tammany Parish Mosquito Abatement District
Performance Review
Final Report**

**Prepared by
The Balmoral Group, Winter Park, FL
Prepared For
St. Tammany Parish Mosquito Abatement District**



Version #2
10 October, 2026

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Executive Summary

The St. Tammany Parish Mosquito Abatement District (STPMAD, the district) was established to provide mosquito control services for the residents of St. Tammany Parish. The district is a unit of local government in southeastern Louisiana that provides service across a total land area of 846 square miles. The district is one of Louisiana's larger mosquito control districts, serving a population of approximately 279,100 in 2025. The parish population is growing and is expected to increase by 4.3% through 2030.

The natural conditions and septic infrastructure of the parish, in combination with the area's warm temperatures, provide a conducive environment for rapid mosquito population development that requires mosquito control services. St. Tammany Parish experiences frequent tropical storms, hurricanes, and river flooding. Soil conditions, which are dominated by slow-draining clay and loam-based soils, and the flat geomorphology of the area contribute to persistent standing water issues. The northern region of the parish mostly contains open pasture areas, and the southern region is mostly made up of marshes. An additional characteristic of St. Tammany Parish is the prevalence of onsite sewage disposal systems. Over 600 miles of roadside septic ditches exist within the service area, and more than half of the septic systems are malfunctioning or failing¹.

The district was established by referendum in 1968 to control mosquitoes and is governed by a board of five commissioners that are appointed by the Parish Council and Parish President. The Board is actively engaged in review of operational success, financial stewardship, and efficiency. The district's public health mission is to protect the health and quality of life of the residents of St. Tammany Parish by minimizing the risk of mosquito-transmitted diseases and managing nuisance mosquitoes to a tolerable level. Due to the unique and challenging environmental conditions in the parish that make it particularly conducive to the rapid development of mosquito populations, the district has committed an Integrated Mosquito Management (IMM, often referred to as Integrated Pest Management) framework that includes arbovirus surveillance; public education; source reduction; insecticide application; treatment evaluation; and insecticide resistance monitoring activities. The district has developed innovative tools and research techniques to maximize its efficiency and effectiveness of treatment decisions, insect resistance testing, and disease monitoring.

The Balmoral Group worked in consultation with two independent mosquito control experts in the course of this review and found that STPMAD follows industry best practice standards for IMM and provides mosquito control services to residents as provided in state law. The district has demonstrated effective and efficient resource management; and, it should carefully manage assets to maximize the benefit of the investments to the taxpayer. STPMAD has clearly defined goals and objectives, has

¹ Kane, E.A., V.K.Y. Shubham, A. Fogle, N.A. D'Souza, N. Delisi, and K. Caillouët. (2024). Battle of the Bites: The Effect of Sewage Effluent Exposure on Mosquitofish Biocontrol of Mosquitoes in Residential Louisiana, *Toxics*, 12(4), 259. <https://doi.org/10.3390/toxics12040259>

developed a comprehensive strategic plan, and has recently established performance measures. Similar to other mosquito control districts, it monitors performance using service call responses and disease prevalence metrics.

Based on its review, The Balmoral Group presents the following recommendations for the improvement of mosquito control services in St. Tammany Parish:

- Due to concerns about recent cuts to benefits and salaries in an effort to reduce the overall budget, the district should consider ways to ensure employee retention is not adversely affected; one approach could be to consider limiting senior staff salary increases to allow for junior level staff pay increases in the future.
- While the district's aircraft and vehicle assets are consistent with other mosquito control districts of comparable size and scope, the district should carefully plan the usage of the helicopter to maximize the value of the investment to taxpayers.
- The district should continue current training efforts for senior leadership and other staff to remain up-to-date on industry standards; the district should consider increasing training opportunities for board members.
- The district should continue its education and outreach strategy implementation and identify opportunities to reach members of the public who may still lack complete understanding of district activities and services.
- As the district continues to implement its recently established performance measures, it should consistently monitor, document, and report performance to enable management and the Board to effectively track progress toward achieving its operational goals.

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ACRONYMS

BCR – Benefit-Cost Ratio

Bs – Bacillus Sphaericus

Bti – Bacillus Thuringiensis Israelensis

CBA – Cost-Benefit Analysis

CDC – Center for Disease Control

CY – Calendar year

EEEV – Eastern Equine Encephalitis Virus

EPA – Environmental Protection Agency

FY – Fiscal year

GIS – Geographic Information System

IMM – Integrated Mosquito Management

IPM – Integrated Pest Management

LA – Louisiana

LDH – Louisiana Department of Health

LEV – La Crosse Encephalitis Virus

LSU – Louisiana State University

MAD – Mosquito Abatement District

MCD – Mosquito Control District

OSDS – Onsite Sewage Disposal Systems

SLEV – St. Louis Encephalitis Virus

STP – St. Tammany Parish

STPMAD – St. Tammany Parish Mosquito Abatement District

TBG – The Balmoral Group

WNF – West Nile Fever

WNND – West Nile Neuroinvasive Disease

WNV – West Nile Virus

WTP – Willingness-To-Pay

1. Introduction

The Balmoral Group was contracted by the St. Tammany Parish Mosquito Abatement District (STPMAD) to conduct a comprehensive review of its operations, service delivery, and associated costs and benefits that identifies strengths, opportunities and efficiencies. This review was conducted to provide an objective, evidence-based assessment of these activities as compared to best practices in mosquito control and other comparable programs. Results of the review provide taxpayers, residents, district leadership, and decision-makers with an objective, evidence-based assessment of STPMAD's services relative to industry best practices and comparable mosquito abatement programs.

2. Methodology Overview

The Balmoral Group (TBG) conducted a comprehensive evaluation of the St. Tammany Parish Mosquito Abatement District (STPMAD) to determine its effectiveness, efficiency, operational alignment with statutory requirements and identify opportunities for improvement. Information on project team member background and expertise is provided in **Appendix A: Project Team**. **Figure 1** outlines the program evaluation project phases that were undertaken throughout the review, and the following section describes the main components of the evaluation methodology.

Figure 1: STPMAD Program Evaluation Project Phases



Source: TBG work product.

a. Data Collection and Analysis

TBG conducted a systematic review of program documentation and available data to develop a clear understanding of the current structure, operations, and performance of STPMAD. Consistent with the structured approach applied in the Florida Legislature's performance reviews of 15 Independent Mosquito Control Districts, TBG applied standard program evaluation methodology to assess STPMAD's programs, activities, and functions, including thorough review and analysis of:

- governance and oversight practices;
- service delivery and operational workflows;
- alignment between District purpose, goals, objectives, and performance measures;
- resources, revenues, expenditures, and cost drivers; and
- opportunities to improve operations, enhance transparency, reduce costs, and strengthen accountability while maintaining the integrity of the District's public health mission.

This framework was used to define the District's core programs and activities; characterize the service area and operational environment; document governance structure and accountability mechanisms; and establish the analytic structure for subsequent assessment of service delivery, performance measurement, resource management, and value to taxpayers. The team gathered relevant documentation and data including statutory requirements, administrative rules, internal policies, budget documents, financial statements, program reports, operational protocols, staffing descriptions, equipment inventories, historical performance data, and other information. This allowed TBG to develop a structured evaluation framework that aligns review criteria with local and state mosquito control requirements applicable to STPMAD and reflects operational realities and intended service outcomes.

Information gathered was synthesized to summarize activities, operations, performance evaluation frameworks, areas of complexity, and potential data and information gaps. Data and information were standardized into a consistent analytic structure to support cross-unit comparisons, trend analysis, financial assessments, and performance measurement reviews. This included assessment of service effectiveness relative to stated goals, public health outcomes, budgetary confinements and community needs. This standardized dataset directly informed the comparative benchmarking, operational assessment, and development of findings and recommendations.

b. Stakeholder Engagement and Site Visits

Stakeholder engagement was an essential component of the evaluation, as program effectiveness is influenced not only by internal operations but also by the expectations and experiences of service recipients, governing bodies, and partner agencies. Gathering information from stakeholders and industry experts provided critical inputs to allow comparison of STPMAD services and performance against recognized industry best practices and benchmarking against comparable mosquito abatement

districts or science-based governmental programs at the state and national level. TBG implemented a qualitative assessment approach that combined interviews, surveys, and site visits with STPMAD program staff and administrators, other mosquito control agency staff in the region, industry experts, relevant agency staff with expertise in arbovirus and mosquito control. In addition, the team consulted regularly throughout the project with two Subject Matter Experts who have extensive knowledge of mosquito control and best practices at state and national levels.

TBG developed an interview and stakeholder engagement plan early in the project that identified key internal and external stakeholder groups, defined interview and survey objectives and core question sets, and established a structured interview schedule to ensure that perspectives were gathered systematically across management, operational staff, governing bodies, and relevant partner agencies. The stakeholder engagement work consisted of the following main components:

- Two-day site visit of STPMAD facilities by two TBG team members; this included onsite stakeholder and district staff interviews, and direct observations of district facilities and day-to-day operations.
- Interviews with 20 stakeholders using a structured question format to elicit perceptions and opinions of interviewees of the district's performance.
- Public survey to obtain direct input from community members on district effectiveness and efficiency in the delivery of mosquito control services and to identify potential opportunities for improvement; survey was sent out to 267 participants, including a mix of stakeholders, residents, state agency and local government officials.

c. Cost-Benefit Analysis

TBG conducted a Cost Benefit Analysis (CBA) for STPMAD to evaluate the economic, environmental, and social implications of the district's activities. The objective of the CBA was to provide a defensible and transparent assessment of the net benefits associated with the district's mosquito control activities, consistent with federal guidance and TBG's proven methods. The analysis assessed the extent to which STPMAD's activities provide value to residents and taxpayers by comparing the costs of operations to the benefits generated through public health protection, nuisance reduction, and risk mitigation. TBG's process draws on almost two decades of experience conducting CBAs for infrastructure, environmental restoration, resiliency, and capital investment projects.

TBG's approach applied a structured framework that identifies and quantifies direct, indirect, and non-market costs and benefits. The analysis incorporated economic appraisal principles, including development of a realistic baseline, evaluation of alternatives, and documentation of assumptions that influence costs and benefits. The CBA included the direct costs associated with STPMAD services, including operational, staffing, and capital expenditures as described above. TBG used a combination of client-provided data, stakeholder interviews, publicly available datasets, and literature values to

populate the analysis. Analytical methods included cost estimation, unit value assignment, willingness-to-pay valuation, market price analysis, and ecosystem service quantification. All monetary values were converted to a common base year and discounted to reflect present value.

TBG applied a discount rate consistent with federal guidance or program-specific requirements. Sensitivity analysis was conducted using alternative discount rates and key variables that may influence the benefit-cost ratio. TBG calculated net present value, benefit-cost ratio, and incremental cost-effectiveness metrics. Results are presented in narrative form and accompanied by summary figures and tables showing the breakdown of costs and benefits.

3. Background

a. District Description

District Purpose

The St. Tammany Parish Mosquito Abatement District (STPMAD, the district) was established in 1968 and specializes in mosquito management for the parish and conducts activities including surveillance and trapping; larvicide treatments; truck and aerial treatment; and research. The district's public health mission is to protect the health and quality of life of the residents of St. Tammany Parish by minimizing the risk of mosquito-transmitted diseases and managing nuisance mosquitoes to a tolerable level. The district accomplishes this by applying the multi-modal framework of Integrated Mosquito Management (IMM, often also referred to as Integrated Pest Management or IPM), which includes mosquito and arbovirus surveillance; public education; source reduction; insecticide application; treatment evaluation; and insecticide resistance monitoring activities.

The stated purpose of the district is the abatement, control, eradication, and study of mosquitoes and other arthropods of public health importance. Since inception, the district's activities have aligned with promoting the health, safety, and welfare of St. Tammany Parish residents through advanced pest management practices.

Service Area

STPMAD provides service to the entire St. Tammany Parish, covering a total land area of 846 square miles. Service is provided across a broad area, extending from the Village of Folsom in the northeast and communities bordering the western side of the Pearl River to Fritch Marsh in the southeast and the City of Mandeville in the southwest. The MAD's headquarters is located at 62436 Airport Road in Slidell, Louisiana, 70460. **Figure 2** shows a map of the St. Tammany Parish boundary along with the MAD headquarters location.

Figure 2. Map of District Boundary and Headquarters Location

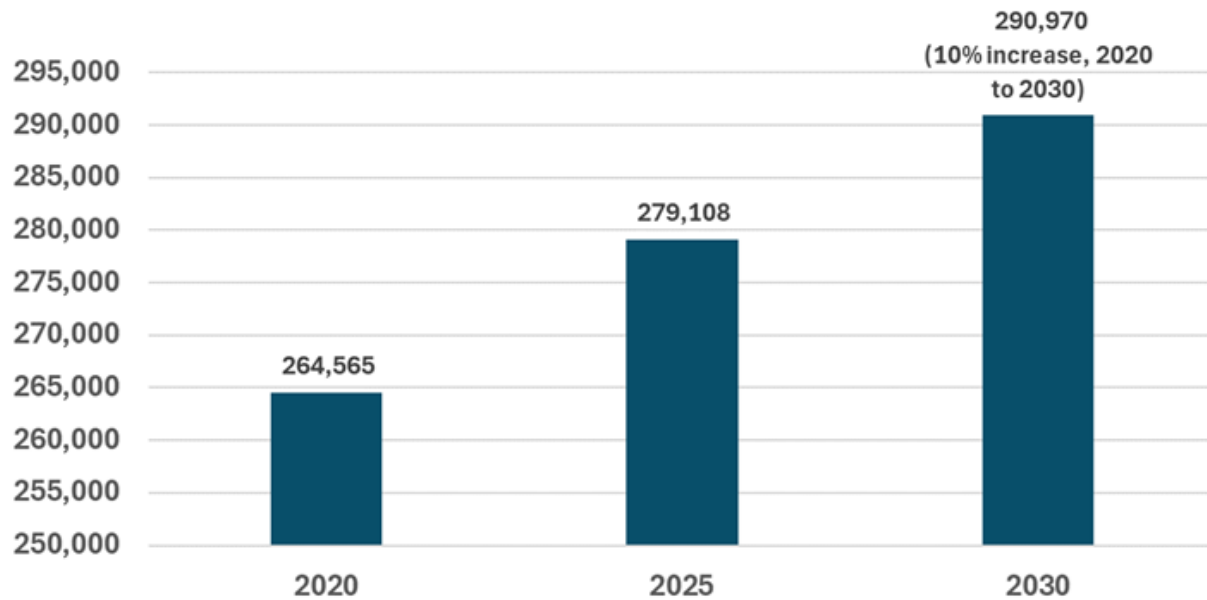


Source: TBG Work Product, ESRI, STPMAD

Population

St. Tammany Parish's population was estimated at 279,108 persons as of July 1st, 2025 according to the U.S. Census. ESRI's Updated Demographics layer (Vintage: 2025/2030) projects St. Tammany Parish's population to increase by 4.3% through 2030 to 290,970 residents compared to a 2025 baseline. **(Figure 3)** shows St. Tammany Parish's projected population estimates calculated by TBG using U.S. Census and ESRI data.

Figure 3. St. Tammany Parish Population Projection



Source: TBG Work Product, U.S. Census, ESRI

District Characteristics

St. Tammany Parish is located in southeastern Louisiana, bordering parts of Mississippi (Pearl River County and Hancock County) and additionally borders Lake Pontchartrain. It is next to Washington, Tangipahoa, and Orleans Parish. The average annual temperature is 68°F and the area receives about 60 inches of rainfall on average per year. Within Louisiana, St. Tammany Parish is the 16th largest parish in terms of total acreage and 4th in population size. The most densely populated cities, notably Slidell, Mandeville, and Covington are spread out across the parish. The population growth rate percent change from 2020 to July 2025 for St. Tammany Parish was 5.3%, representing the 8th highest in the state. The population growth rate average of all parishes across Louisiana from 2020 to July 2025 was -2.1%, with over 73% of parishes having a negative growth rate. Currently, residential development forms 18% of St. Tammany's land cover. 31% of the land is forest/wooded land, 8% is open pasture, 1% is agriculture, 30% is wet forest/swamp, 7% is marsh/wetland, and 5% is open water.

St. Tammany Parish experiences frequent tropical storms, hurricanes, and river flooding. Soil conditions, which are dominated by slow-draining clay and loam-based soils, and the flat geomorphology of the area contribute to persistent standing water issues. The northern region of the parish mostly contains open pasture areas, and the southern region is mostly made up of marshes.

A defining operational characteristic of St. Tammany Parish is the prevalence of onsite sewage disposal systems. Over 600 miles of roadside septic ditches exist within the service area, and around 56% of the

septic systems are malfunctioning or failing. Residents who are in close proximity to septic ditches and woodland areas often express their concerns about mosquitoes in the area.

The natural conditions and septic infrastructure of the parish, in combination with the area's warm temperatures, provide a conducive environment for rapid mosquito population development that requires mosquito control services. Some of these services include mosquito population surveillance, public education, source reduction, disease surveillance, and ground and aerial insecticide applications that target immature and adult mosquitoes.

Property Data

STPMAD receives ad valorem taxes to fund district operations. The total taxable value of properties within the district was over \$3 billion in 2025, under a millage rate of 3.10 (**Table 1**). Taxable value increased 45% in 2025 compared to 2020. The district has made a concerted effort to reduce the millage rate over time.

Table 1. Millage Rates and Taxable Value of Properties Subject to STPMAD Millage

	2020	2021	2022	2023	2024	2025
Acres Assessed	246,528	246,968	245,100	225,217	237,505	229,466
Tax Payers	139,985	141,682	143,258	145,525	145,147	133,379
District Millage Rate	3.90	3.90	3.57	3.35	3.35	3.10
Taxable Value (\$Mil.)	\$2,136	\$2,381	\$2,416	\$2,500	\$2,597	\$3,103
Taxpayer Tax (\$Mil.)	\$8.33	\$9.29	\$8.62	\$8.37	\$8.72	\$9.62

Source: St. Tammany Parish Assessor's Office

b. History and Composition

The St. Tammany Mosquito Abatement District was established on April 18th, 1968. The original Mosquito Abatement District covered only the greater Slidell and Pearl River areas. Lacombe, Covington, and Mandeville joined the district by 1993, Madisonville approved the tax in 2000, and by 2001, all remaining areas of the parish joined the district. The district was founded under Title 33 of the Louisiana State Legislature Chapter 23 Section 7721-29. The district is also subject to the St. Tammany Parish Council Ordinance 18-152 which allowed certain exemptions for the district so they can spray and treat areas that were unincorporated in the parish.

Pursuant to RS 33:7723, STPMAD has an appointed Board of Commissioners (the Board) composed of five members to govern the affairs of the district. Members of the Board serve three-year terms and are appointed by the Parish Council and Parish President. Positions include Chairperson, Vice-Chairperson, Secretary/Treasurer, and 2 other Commissioners. The district also has an Advisory Board consisting of two members. Board members serve without compensation but may be reimbursed for reasonable expenses incurred in connection with their duties as board members.

c. Intergovernmental Interactions

STPMAD faces numerous unique challenges due to its relatively large geographic coverage region (compared to other districts in Louisiana, as it is one of the largest), a fast-growing population, and challenging environmental conditions including frequent rainfall, stagnant water, and septic ditches. The district has developed numerous partnerships and effectively collaborates with other agencies and organizations to improve its service delivery and develop new strategies to address the challenges it faces.

The district partners with numerous local entities including the Pontchartrain Conservancy, Louisiana Department of Wildlife and Fisheries (LDWF), St. Tammany Parish Department of Environmental Services, St. Tammany Parish Utilities, St. Tammany Parish Library, Louisiana Department of Health (LDH), Louisiana Sea Grant, Louisiana State University AgCenter, St. Tammany Parish Public Schools, and others. A few examples of their partnerships and collaborative activities include:

- St. Tammany Parish Utilities inspects and works with STPMAD to gain access to certain privately owned package sewage plants. STPMAD coordinates for updates on the septic issue as it affects the location and concentration of mosquitoes, particularly close to residents as higher alert.
- The LDH issues weekly and annual statewide reports on arboviral diseases, including the number of infected mosquitoes and humans by parish and by type of disease including West Nile Virus, Eastern Equine, Saint Louis, and La Crosse Encephalitis.
- The Pontchartrain Conservancy and STPMAD collaborated on a four-year EPA-funded project to address the problem of mosquitoes originating from sewage.
- LDWF supplies herbicide product to STPMAD to apply in various areas that they would typically maintain for navigational reasons where there is nuisance vegetation.
- The St. Tammany Parish Department of Environmental Services and STPMAD partnered, researched, and committed funding to help expand the septic inspection program, reducing costs for homeowners for the first three years of the program.
- STPMAD collaborates with the St. Tammany Parish Library to host outreach and educational events along with presentations.

In addition, STPMAD regularly interacts with other similar mosquito abatement and pest control districts in Louisiana, including the East Baton Rouge, Iberia, and Tangipahoa Parishes along with the New Orleans Mosquito, Termite and Rodent Control Board. The district exchanges information on latest mosquito control information, techniques, treatments, and legislative changes and shares resources with other districts. For example, STPMAD also has an aerial adulticide application sharing agreement with Tangipahoa Parish Mosquito Abatement District in the event their airplane is out of service.

d. Resources for Calendar Year 2026

The published 2026 millage rate established by the district was 2.27. STPMAD is expected to receive \$6.16 million in revenues from combined ad valorem and state revenue sharing sources. Expenditures through June 2026 were \$3.93 million. In past years, annual expenditures have ranged from \$6.70 to \$13.36 million. STPMAD had 54 paid staff and owned 68 vehicles and 3 buildings in 2026. A summary of STPMAD resources for calendar year 2026 is shown in **Table 2**.

Table 2. STPMAD Resources for 2026

Resource Item	2026 Amount
Millage Rate	2.27
Revenues	\$6.16 million
Expenditures	\$3.93 million
Number of Paid Staff	54
Vehicles	2 aircraft, 3 boats, 63 ground vehicles
Equipment	Field equipment: 132 Lab equipment: 44 Office equipment: 92 Surveillance equipment: 290
Facilities	3 facilities, 3 buildings

Source: Revenues sourced from STPMAD Treasurer's Reports, 2020-March 2026. Capital Outlay and Expenditures sourced from Annual Financial Reports, 2020-June 2026

4. Findings

The STPMAD delivers comprehensive mosquito control services throughout the parish that are consistent with state and national best practices and guidelines and with other mosquito control districts of similar size and scope, for example Pasco and Manatee Mosquito Control Districts in Florida are considered to be comparable. The district employs innovative research to constantly strive for improvements to the efficiency and effectiveness of its operations. The district manages its resources efficiently and effectively. The district's resources and asset inventory are consistent with the Florida districts of similar size and scope of activity.

a. Service Delivery

STPMAD follows industry standards for IMM and delivers services using innovative tools, techniques, and thorough analysis of daily conditions to maximize the efficiency and effectiveness of its delivery of mosquito control services, pursuant to Louisiana state law.

To assess the delivery of services in the district, 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; and local stakeholder perceptions of the relative value of the district's services. TBG conducted stakeholder interviews and surveyed representatives of the Board of Commissioners, local and state government agencies, educational institutions, nonprofit organizations, and other entities that work with or are familiar with the services of the district, in addition to local residents.

Overview of Services

STPMAD uses an IMM plan to control mosquito populations, which targets the different stages of a mosquito's life cycle with various prevention and control measures. The district's IMM (also known as Integrated Pest Management or IPM) follows guidance provided by the American Mosquito Control Association's Best Management Practices as well as the Centers for Disease Control (CDC) Guidelines for West Nile Virus Surveillance and Control^{2,3}. The STPMAD IMM is comprised of five key components.

- 1) **Surveillance** of mosquito populations is an essential component of all IMM programs with treatments based on the surveillance findings.
- 2) **Larval control** is a proactive measure, targeting larval populations and also includes source reduction (e.g., container disposal, water/impoundment management).
- 3) **Adult control** targets adult mosquitoes, delivering insecticides via different types of vehicles depending on the site characteristics.
- 4) The district also does **outreach** with various groups, including site visits with residents to educate and examine mosquito presence, community and school presentations, and online via the STPMAD website and social media accounts.
- 5) **Evaluation** focuses on resistance and efficacy testing and efficiency reviews of services and products.

TBG reviewed documentation provided by STPMAD, interviewed staff and management, and conducted internet research on the district's services to assess delivery of services. A summary of the eight areas of IMM in which STPMAD conducts activities is set forth in **Table 3**.

² <https://www.mosquito.org/bmp/>

³ <https://www.cdc.gov/west-nile-virus/php/surveillance-and-control-guidelines/index.html>

Table 3. STPMAD Services Overview

Integrated Mosquito Management Service	STPMAD Services Provided
Mosquito Surveillance	Daily surveillance using traps, landing rates, and field inspections.
Disease Surveillance	Mosquito pools are tested for arbovirus presence.
Source Reduction	Emptying containers when responding to resident service requests and community education on source reduction.
Larviciding	Application of larvicides using ground and aerial vehicles; liquid and granule to control the immature aquatic larval stage.
Adulticiding	Delivery of insecticide performed through trucks, fixed-wing, or rotary-wing aircraft to control the adult stage of the mosquito
Biological and Alternative Control	Mosquito-eating fish hatchery (<i>Gambusia affinis</i>); treatment to aquatic plants to prevent larvae development.
Mosquito Control Research	Ongoing research efforts to identify new methods and technologies to improve treatment efficiency; resistance testing.
Outreach and Education	Education and outreach facilitated through libraries, resident service requests, public meetings, presentations, website and social media outlets.

Source: TBG Work Product, STPMAD.

Within St. Tammany Parish, there are four identified arboviral pathogens that have been historically apparent and have resulted in human infections including the *Eastern equine encephalitis virus* (EEEV), *La Crosse encephalitis virus* (LEV), *St. Louis encephalitis virus* (SLEV), and *West Nile virus* (WNV). The following services employed by STPMAD aim to reduce human arbovirus risk along with the presence of nuisance mosquitoes to improve quality of life for residents. Information about mosquito control services is derived mainly from two STPMAD documents: the 2026 Integrated Mosquito Management Plan⁴ and the 2025 Guide to Understanding Integrated Mosquito Management⁵.

Surveillance

The basis of IMM for STPMAD involves the surveillance of vector and nuisance mosquitoes to determine thresholds, priority areas, and potential public health risks. The district has established various techniques for observing and quantifying the magnitude of mosquitoes in the area, including trapping, landing rates, and inspections conducted by field biologists. STPMAD has drafted a Mosquito and Arbovirus Surveillance Plan in accordance with CDC guidelines.

⁴ https://stpmad.org/wp-content/uploads/2026/04/STPMAD-IMM-2026_04.23.2026.pdf

⁵ https://stpmad.org/wp-content/uploads/2025/03/Guide_To_IMM_for_web.pdf

There are 131 established trap sites throughout the parish, each of which is trapped at least biweekly. Known problem areas and regions with high concentrations of outdoor human activity, such as schools and ball parks, are trapped more frequently. Traps used include Ovitrap, Emergence Traps, BG Counter Traps, and No-Light CDC Traps, with the latter being the primary collection method. No-Light CDC Traps have dry ice placed inside a standard water cooler that attracts mosquitoes and traps them once they enter. Baited versions are currently being tested for effectiveness and overall cost savings. These traps are established across the parish and are put out in the afternoon and collected the next morning to identify the type of species and associated counts for testing and arbovirus detection. BG Counter traps operate with a CO₂ canister inside a metal box to attract mosquitoes and additionally record the time that each mosquito is captured to provide activity insights. These traps are left out longer and are collected once a week. Ovitrap collect mosquito eggs to monitor species that typically spawn from open containers holding water across the parish, with traps set from July to October each year and year-to-year surveillance measures conducted in areas containing the yellow fever mosquito (*Aedes aegypti*). Emergence traps specifically target mosquitoes emerging from water environments and are placed in roadside ditch habitats, aquatic plants, and other water sources. The district may occasionally implement CDC Gravid Traps, CDC Resting Box traps, aspirators, and midge traps.

Additionally, landing rates serve as indicators of mosquito activity and are conducted by mosquito biologists remaining motionless in a shaded area and counting/identifying the mosquitoes that land on them over the course of 60 seconds. The surveillance process also includes occasional door-to-door inspections of septic systems to reduce source pollution that provides a breeding ground for mosquitoes in the area through education and treatment.

When WNV is detected within the parish or there are a large number of service requests in an area, STPMAD will inspect multiple properties within a neighborhood. Inspection schedules may also vary by area and time of year. Floodwater sites, such as residential areas, woodland areas, and randomly-selected ballparks, are routinely assessed by taking landing rates. Marsh inspections are performed biweekly via ground, truck, and/or airboat from April to October, and sewage package plants are inspected during the Spring and Fall. Additionally, inspections can be requested by residential and commercial properties through electronic request forms.

Larval Control

Another pivotal step of IMM for the district is treating mosquitoes proactively in the larval phase, the intermediate stage before mosquitoes reach adult development. The district tailors larval mosquito treatments to specific habitat types and species. Such treatments include larvicide/insecticide control, the removal of invasive plants, the Mosquitofish Program, source reduction, and outreach initiatives.

A primary control measure is source reduction, which involves the removal of potential breeding sources for mosquitoes. This includes reducing containers holding water on residents' properties, since some mosquito species prefer to lay their eggs in these containers. Additionally, according to the Pontchartrain Conservancy, 57% of onsite sewage disposal systems (OSDS) are not properly maintained and discharge partially treated sewage into roadside drainage ditches. This environment serves as the prime breeding ground for the southern house mosquito (*Culex quinquefasciatus*), which spreads WNV in STP.

Larvicide operations are carried out during the day along more than 600 linear miles of roadside septic ditches in the parish, with the frequency of application varied throughout the mosquito season. STPMAD has larval management tiers in response to changing environmental conditions that affect the risk of WNV transmission. Tier 1 operations are carried out from November through March, when development time is greater than 15 days, and includes the treatment of ditches with *Bacillus thuringiensis israelensis* (Bti), a liquid insecticide that kills developing larvae of mosquitoes, or spot treatments with larvicide oil about every two weeks. Tier 2 operations involve larvicide staff spraying sites for 32 hours a week, occurring from March through May and from October to November, where development time is from 8 to 15 days. Tier 3 management occurs when development time is less than 7 days from May through October, or in response to public health emergencies. Tier 3 treatment involves spraying Bti and *Bacillus sphaericus* (Bs) at least once every five days.

Larvicide application methods vary based on the site environment. In floodwater habitats, extended-release granule larvicides, such as methoprene, are deployed in ground pools. In marsh habitats, larvicides are applied by hand, truck, airboat, and/or helicopter when mosquito larvae are present. When surveillance indicates high counts of septic-preferring mosquito species, field biologists reinspect and use residual larvicides on sewage package plants. Additionally, field biologists treat standing water with larvicides during property inspections. In the event of a positive WNV lab result or human case, wide area larviciding is done using a truck mounted unit, projecting Bti or Bs into the air to reach water sources across high density residential areas.

Plant and biological management are additional larval control methods. The treatment of invasive aquatic plants, such as salvinia and water hyacinth, aids in controlling specific mosquito species that lay eggs or larvae that can breathe oxygen through the plant roots. Herbicides are administered through drones to control the invasive plants. Additionally, STPMAD's Mosquitofish Program involves raising native mosquitofish, which are effective predators of mosquito larvae, at their office and making them available for residents to pick up.

Adult Control

In addition to larval control, the district manages mosquito populations by applying insecticides (adulticides) that target adult mosquitoes. Service delivery is determined by the treatment of either vector mosquitoes, which are species that can carry arboviruses, or nuisance mosquitoes, which are species that cause discomfort and interrupt outdoor activities. For vector mosquitoes, insecticide treatments are decided by the triggering of thresholds that STPMAD has developed from surveillance measures, with inputs including the type of species present, arbovirus detection, landing rates, resident reporting, and temperature conditions.

STPMAD treats nuisance mosquitoes by applying adulticides in locations where more than eight mosquitoes are recorded in landing rates, more than 500 mosquitoes are collected per trap each night, or more than one public mosquito concern has been recorded in the treatment area. Treatments are more likely to be applied during times when forecasted temperatures are expected to be higher than the daily average (for example, during winter months, when the daily average temperatures are normally less than 58 °F). Nuisance mosquito treatment is reduced by half in locations that have not received adulticide treatment in 60 days during the mosquito season.

Temperature affects the life cycle of mosquitoes as well as the arbovirus development time within mosquitoes, with higher temperatures leading to the rapid development of mosquito populations within the district. As a result, STPMAD has established a temperature-based threshold system for vector mosquito species regarding the areas that should receive treatment and the frequency of treatment. Criteria includes the mean 14-day temperature, the number of WNV-infected pools, and the abundance of adult mosquitoes. The number of days between adult mosquito treatments is also based on the mean 14-day temperature, the presence of active arbovirus, and the type of insecticide class to limit mosquito resistance to the insecticides.

STPMAD offers adulticide treatment for private properties, such as residential areas, and public properties, such as parks, recreational facilities, and schools. Mosquito biologists conduct door-to-door inspections when WNV is detected in an area or when residents submit multiple service requests, and they apply adulticide where mosquitoes are present. Adulticide application to private and public areas within STP can be delivered via truck and ATV/UTV. Adulticides are also delivered through aircraft if the threshold has been met across one or more contiguous zones. Adulticide is applied after dark to minimize risk to beneficial pollinators and to target the timeframe when mosquitoes are most active. Daytime truck adulticide treatments may be conducted under a strict set of criteria due to the presence of heightened arbovirus risk.

Outreach

STPMAD has developed an outreach and education framework with three primary components: media relations, social media, and education/outreach. The district has developed publications and reports, flyers, mailers, video and photography and website content that provide comprehensive and easy to understand information to the public about the activities of the district.

Outreach and education activities include school-based education programs that teach students about mosquitoes and mosquito control, as well as fairs, presentations to local homeowner associations, tours of the facility, brochures, and direct phone and email contact lines. The district also reaches out through its website, social media, and numerous community events such as master gardener, rotary, and other organizations' events.

STPMAD also interacts with other stakeholders on a regular basis, including local environmental organizations and other nonprofits like St. Tammany Beekeeper and Pontchartrain Conservancy. The district has established successful working relationships with these groups, which is not always common among mosquito control districts. The district has developed good working relationships with these groups by identifying areas of common ground by working towards a collective goal of improving environmental conditions across the parish, including working to reduce the sewage/septic pollution issues that would generate environmental improvements to water quality and help reduce mosquito populations.

Lab Testing

The district's in-house laboratory tests for various components including arbovirus risk, insecticide resistance, and treatment evaluation. STPMAD has an in-house laboratory in which they conduct daily testing of mosquito samples for presence of arbovirus. The tools and technology in the lab offer the district the ability to stay ahead of arbovirus occurrence because it provides real-time monitoring tools. In one year, the lab staff can test 6,500 groups of mosquito samples at a cost of \$12/sample. Alternatively, samples could be sent to a state-run laboratory for testing, and while the cost in dollars is lower at \$5/sample, the turnaround time for results for state lab testing ranges from five to nine days. The district, like many other mosquito control districts in Florida, has made the determination that the additional similar per-test cost outweighs the risk of delayed arbovirus detection. Other parish pest control districts, such as New Orleans, also conduct their own in-house testing. This allows districts to mitigate the risk of disease spread immediately versus waiting several days and increasing public health risks.

A challenge in mosquito control is managing for insecticide resistance that mosquitoes can develop. STPMAD established an insecticide resistance monitoring program⁶ in 2018 to identify the locations and species that display resistance and to work on developing strategies to combat the process. An integrated approach is taken to mitigate the development of insecticide resistance. First, source reduction and larvicides are used to manage mosquitoes without the use of broad-spectrum insecticides. Second, treatment thresholds based on risk type and temperature are defined to selectively use adult mosquito insecticides. In addition, insecticide products are rotated to ensure the genes conferring specific types of resistance are not promoted. Finally, STPMAD also collaborates with commercial chemical manufacturers to test the efficacy of products.

Topical bioassays are the primary tests conducted by the lab which involve injecting adult mosquitoes with different quantities and types of insecticide, and analyzing their mortality at each concentration. The testing method allows researchers to calculate the resistance intensity of mosquitoes in a specific location. STPMAD also conducts larvicide bioassays that involve collecting larvae from the same age population, exposing them to different concentrations of larvicides for 24 or 28 hours, and identifying the number of dead larvae per concentration group.

The district regularly conducts trials to test the efficiency of alternative insecticides and has found that, if alternative insecticides are proved to be efficient, they can be incorporated in an insecticide rotation. The district regularly rotates their insecticides based on the best treatments for *Cx quinquefasciatus* every three to four months to maintain efficacy, and follows an insecticide rotation schedule for truck spraying including DeltaGard (deltamethrin) and Fyfanon (malathion). In 2026, STPMAD found that some mosquito populations were manifesting resistance to Scourge (resmethrin), leading to changes in the district's insecticide rotation cycles. For aerial application, the plane uses Dibrom and the helicopter uses Imperium as they are ultra-low volume aerial insecticides.

Analysis of Delivery Services

STPMAD provides comprehensive mosquito control services throughout the parish that are consistent with national IMM standards and sets an example of effective IMM in the context of multiple environmental and demographic challenges. Based on analysis of district documentation, stakeholder and subject matter expert feedback, services are provided in an efficient and effective manner and carefully reviewed on a consistent basis to identify areas for improvement. The district's internally developed IMM document is a thorough, well-developed document that is frequently updated and is considered by subject matter experts to be an exemplary mosquito control management guidance

⁶ St. Tammany Parish Mosquito Abatement District. (2023). Special report: managing insecticide resistance in mosquito control. https://stpmad.org/wp-content/uploads/2023/10/STPMAD_2023_InsecticideResistanceSpecialReport.pdf

document. STPMAD faces several unique challenges including a large and fast-growing population, frequent heavy rainfall events, local geography that causes standing water to be a constant issue, and extensive sewage ditches throughout the district that exacerbate normal mosquito population control issues. The district addresses these challenges through its thorough and thoughtful IMM document combined with daily monitoring and surveillance, to adapt as necessary to ensure the most efficient and effective delivery of services is achieved on a regular basis.

Comparison to Other Services

STPMAD is the sole local government provider of mosquito control services in the parish. During TBG's analysis of STPMAD, residents and stakeholders were interviewed and surveyed for their knowledge, opinions, and comparisons of STPMAD to other mosquito abatement options as well as the potential existence of other mosquito abatement services within St. Tammany Parish. Several directors of other districts in Louisiana were also interviewed to understand what differences and opinions they have of STPMAD, and what STPMAD may be able to learn from them.

Residents and stakeholders noted no other mosquito control programs or services operating within St. Tammany Parish, and mentions of other programs in Louisiana included municipal and parish-led programs like New Orleans and Calcasieu, and other special taxing district programs like East Baton Rouge, Tangipahoa, and Iberia. When residents were asked about how STPMAD compares to other potential service options, the overwhelming consensus was that STPMAD were highly effective, the only program managing mosquitoes in St. Tammany Parish, and either no recommendations for mirroring other programs, or active dissatisfaction with the idea of merging STPMAD into a municipal led program or dissolving it and letting private entities take over their operations.

When program directors were interviewed, they noted their differences with St. Tammany were due to a large service area, extensive septic ditches, and large portions of swampland inaccessible to trucks. While each parish shares some of these same characteristics, St. Tammany was noted for having a specific combination of issues and a level of severity that other districts may not be dealing with. Other directors and stakeholders noted the significant quality of STPMAD not only as an important program for St. Tammany, but also for Louisiana as a whole, and the country, as a valuable mosquito control asset that provides top rate training and experience to share with other programs. Other program directors noted that St. Tammany took careful measures to ensure they were operating fiscally responsible and effectively to ensure their goals are met with the highest quality while maintaining the lowest costs possible for the taxpayer.

Other programs noted similar usages of in-house lab testing, something that is also common with several Florida mosquito control programs, aircraft spraying with both helicopters and airplanes, usage of truck

spraying, service requests, and data driven approaches to spraying and servicing, as these measures are all proven best industry practices and standards. Several programs noted the desire to expand in the same way STPMAD has, but cited a lack of funds, or not having the particular environmental issues STPMAD has to justify such expansions.

The director of New Orleans' Mosquito, Termite, and Rodent Control noted the specific advantages that being a special taxing district has when it comes to providing a cost-effective utility for St. Tammany. When compared to their municipal led program, St. Tammany, as an independent district, has several advantages including not having challenges in obtaining the larvicide and adulticide chemicals when needed, has ability to treat for mosquitos when needed rather than when funds are permitted to treat and avoid city-wide budgetary cuts that impact ability to service.

Considerations for Consolidations

Consolidation or privatization of operations is not recommended for STPMAD based on the findings of this review. During the survey and interview process questions of potential consolidation options were asked of stakeholders and residents. No recommendations for any consolidations of mosquito control services were offered, and no stakeholders or residents requested STPMAD be merged into another program or dissolved. However, some questions were posed if STPMAD is the best program to be handling the aquatic vegetation practices they are conducting in support of mosquito control. While other stakeholders said the quality of their aquatic vegetation treatment was high, others have wondered if a public works or stormwater department would be better suited to handle these practices from a financial perspective. Additionally, questions were posed about the potential for sharing aircraft and other equipment usage between other programs to save costs. However, other stakeholders noted that this would risk the district's capacity for responding to regular and emergency services during natural disasters and heavy rainfall resulting in large mosquito populations

Other directors of mosquito abatement programs also noted a potential for consolidations through human resources (HR) staff and/or insurance as special taxing districts need to acquire their own insurance. There were comments about potential lab consolidations with other mosquito abatement programs, however stakeholders noted that this would reduce the advantage of in-house testing as delays in sample testing may happen again, and the per capita taxpayer savings would likely be too low to warrant such consolidations. Stakeholders routinely noted that any major consolidations for STPMAD would likely reduce their effectiveness, quality, and service delivery timing, and may only save marginal costs to the taxpayers.

b. Resource Management

STPMAD has demonstrated effective and efficient resource management; recent capital outlay improvements will help the district meet the increasing demands that will be placed on it due to continuing population growth and environmental concerns.

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 and reviewed data on services delivered by district staff versus 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

STPMAD's annual revenues have increased since 2020; annual expenditures have fluctuated and exceeded revenues during several years of the review period due to needed capital outlay and facilities improvements. STPMAD's funding is primarily comprised of ad valorem taxes, which represent the vast majority of total revenues. STPMAD's millage rate is established through a parish-wide voter referendum renewed every ten years; the millage rate for 2026 is 2.27. STPMAD's fiscal year begins January 1 and ends December 31. On June 27, 2026, voters approved a millage rate change to 2.95 that will become effective in 2028 for a 10-year period. District staff reported to TBG that, based on their 10-year projections, this millage rate will support their current level of service for the next ten years.

To review current and historic revenues and expenditures of STPMAD (**Table 4**), TBG requested and received financial information from STPMAD for FY 2020 through FY 2026. Revenues increased from \$8.03 million in FY 2020 to \$10.0 million in FY 2025, with the vast majority of revenues coming from ad valorem taxes and smaller amounts from state revenue sharing, interest earned on investments, and proceeds from the sale of equipment. Expenditures exceeded revenues in 2022, 2023, and 2024, and these increases appear to have been driven by significant capital outlays including aircraft purchases in 2022, and the purchase of a new building in 2024. The capital outlay for aircraft and facilities caused increased expenditures in three years of the review period, however these expenditures resulted in increased value, with efficiencies and effectiveness of district operations. These types of expenditures to increase operation efficiencies are normal and well within the scope of other successful mosquito control districts.

Table 4. STPMAD Revenue and Expenditures

Revenues and Expenditures (in \$Mil.)	2020	2021	2022	2023	2024	2025	2026
Revenues	\$8.03	\$9.15	\$8.64	\$9.66	\$9.26	\$10.0	\$6.16
Ad Valorem	\$7.64	\$9.39	\$7.78	\$8.60	\$8.14	\$9.10	\$5.95
State Revenue Sharing	\$0.16	\$0.11	\$0.16	\$0.15	\$0.15	\$0.16	\$0.08
Interest Earned	\$0.10	\$0.02	\$0.35	\$0.74	\$0.65	\$0.57	\$0.12
Other Sources	\$0.13	\$0.14	\$0.34	\$0.16	\$0.32	\$0.20	\$0.05
Reserves	\$8.00	\$8.82	\$6.53	\$6.01	\$4.94	\$5.12	N/A
Expenditures	\$6.70	\$8.32	\$12.26	\$13.36	\$11.44	\$9.32	\$3.93
Administrative Costs	\$0.56	\$0.58	\$0.61	\$0.69	\$0.72	\$0.75	\$0.40
Direct Program and Activity Costs	\$6.14	\$7.74	\$11.64	\$12.67	\$10.72	\$8.57	\$3.52
Capital Outlay (CAPEX)	\$0.23	\$1.48	\$4.78	\$5.95	\$2.94	\$5.74	\$0.00

Source: Revenues sourced from STPMAD Treasurer's Reports, 2020-March 2026. Capital Outlay and Expenditures sourced from Annual Financial Reports, 2020-June 2026.

Evaluating reserves, STPMAD had opted to lower reserves since 2021, only recently increasing them again. Initially increasing to their peak in 2021 at \$8.8 million, the district chose to apply these reserves toward purchasing new equipment and upgrades to fulfill their mission while also maintaining emergency funds for staff and storm events. Some examples of where these unassigned funds were applied include obtaining a new helicopter and fuel truck. Following these acquisitions, reserves began to steadily decrease until 2024, bottoming out at \$4.9 million. Since 2024, reserves have slowly grown to \$5.1 million in 2025. This rise may in part be due to the purchase of an additional building in 2024, as increased reserves can help cover unexpected repairs and overall maintenance.

Administrative Costs

While expenditures on administrative costs have steadily increased since 2020, they have accounted for less than 10% of total expenditures in each year of the review period. Expenditures on administrative staff and other costs increased gradually from approximately \$562,000 in CY 2020 to \$751,000 in CY 2025, accounting for about 7% of total expenditures on average. As requested by TBG, STPMAD provided a breakdown of total expenditures by administrative and other program costs for CY 2020 through June of CY 2026.

Administrative costs to STPMAD fall into several categories, with the majority consisting of personal

services (salaries) and employee benefits (**Table 5**). Personal services represented the largest administrative expenditure each year, increasing from \$278,610 in CY 2020 to \$424,599 in CY 2025. Travel, utilities, repair, and maintenance comprised the next largest share, while operating expenses and supplies and materials represented smaller shares of total administrative expenditures. STPMAD reported no capital outlay under administrative costs in any year. This is consistent with the allocation practices of other MCDs reviewed by TBG, which similarly assign capital purchases to direct program costs.

Table 5. STPMAD Administrative Cost Data

Expenditure Category	2020	2021	2022	2023	2024	2025	2026 ¹
Personal Services	\$278,610	\$278,422	\$318,152	\$363,376	\$379,942	\$424,599	\$186,577
Personal Services Benefits	\$111,341	\$110,319	\$115,998	\$117,863	\$126,418	\$125,716	\$63,893
Operating Expenses	\$45,436	\$72,128	\$33,865	\$32,271	\$46,949	\$15,270	\$13,165
Travel, Utilities, Repair, and Maintenance	\$105,101	\$95,216	\$121,364	\$106,017	\$139,404	\$158,701	\$95,145
Supplies & Materials	\$21,131	\$22,814	\$24,257	\$74,387	\$30,490	\$26,271	\$44,482
Capital Outlay	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$561,618	\$578,900	\$613,636	\$693,914	\$723,203	\$750,556	\$403,261

Source: TBG work product; 2026 YTD through June

Direct Program Costs

Expenditures on direct program costs ranged from \$6.1 million in CY 2020 to a peak of \$12.7 million in CY 2023, before declining to \$8.6 million in CY 2025, and accounted for about 93% of total expenditures on average. As requested by TBG, STPMAD provided a breakdown of total expenditures by direct program costs for CY 2020 through June of CY 2026. Direct program costs fall into several categories, with most falling into personal services, supplies and materials, and capital outlay (**Table 6**). Mosquito abatement (direct costs) made up 88% of total expenditures, in all categories except Administrative Supplies and Expenses, where they made up 60%. Administrative costs made up 12% of the total expenditure share except for Administrative Supplies and Expenses, where they made up 40%. The rise and fall in total direct costs was driven almost entirely by capital outlay, which grew from \$230,925 in CY 2020 to \$6.2 million in CY 2023 before falling to \$587,838 in CY 2025. This pattern reflects the district's deliberate application of accumulated reserves toward equipment purchases and upgrades, including a new helicopter and fuel truck, and the purchase of an additional building in 2024. Excluding capital outlay, direct program costs were considerably more stable, ranging between \$5.9 million and \$8.1 million annually.

Table 6. STPMAD Direct Cost Data

Expenditure Category	2020	2021	2022	2023	2024	2025	2026 ¹
Personal Services	\$2,043,140	\$2,041,761	\$2,333,117	\$2,664,761	\$2,786,240	\$3,113,727	\$1,368,228
Personal Services Benefits	\$816,500	\$809,009	\$850,655	\$864,328	\$927,068	\$921,914	\$468,547
Operating Expenses	\$333,194	\$528,941	\$248,342	\$236,652	\$344,290	\$111,976	\$96,547
Travel, Utilities, Repair, & Maintenance	\$770,742	\$698,251	\$889,999	\$777,456	\$1,022,296	\$1,163,805	\$697,730
Supplies and Materials	\$1,940,706	\$2,787,326	\$1,940,643	\$1,936,775	\$2,990,721	\$2,671,882	\$893,117
Capital Outlay	\$230,925	\$879,407	\$5,381,762	\$6,190,585	\$2,646,713	\$587,838	\$0
Total	\$6,135,208	\$7,744,694	\$11,644,518	\$12,670,557	\$10,717,328	\$8,571,143	\$3,524,170

Source: TBG work product, STPMAD 2026 YTD through June

Contracts for Services

STPMAD occasionally contracts out services when in-house aircraft are undergoing maintenance, or when additional staffing support is needed for aerial operations in the aftermath of major storms. TBG reviewed documentation provided by the district and interviewed STPMAD staff to determine the costs associated with any contracted services that occurred over the study period (**Table 7**).

Table 7. Summary of Contracted Services

Contract	2020	2021	2022	2023	2024	2025
Direct - Aerial Adulticide	\$277,958	\$421,346	\$9,984	\$2,778	\$95,238	\$13,242
Direct - Other	\$58,052	\$13,420	\$37,605	\$31,389	\$20,295	\$4,355
Indirect - Other	\$10,607	\$0	\$0	\$925	\$0	\$0
Total	\$346,617	\$434,766	\$47,589	\$35,091	\$115,534	\$17,597

Source: TBG Work Product, STPMAD

Staff

STPMAD employed 57 in-house staff members in 2026 and 61 in 2025 with a variety of responsibilities and expertise. TBG reviewed and analyzed documentation provided by the district to determine the number and positions of those employed by STPMAD and interviewed management. Of the numerous positions, five positions were in administrative roles. In addition, STPMAD employs five volunteer commissioners. Staff positions are listed in **Table 8**.

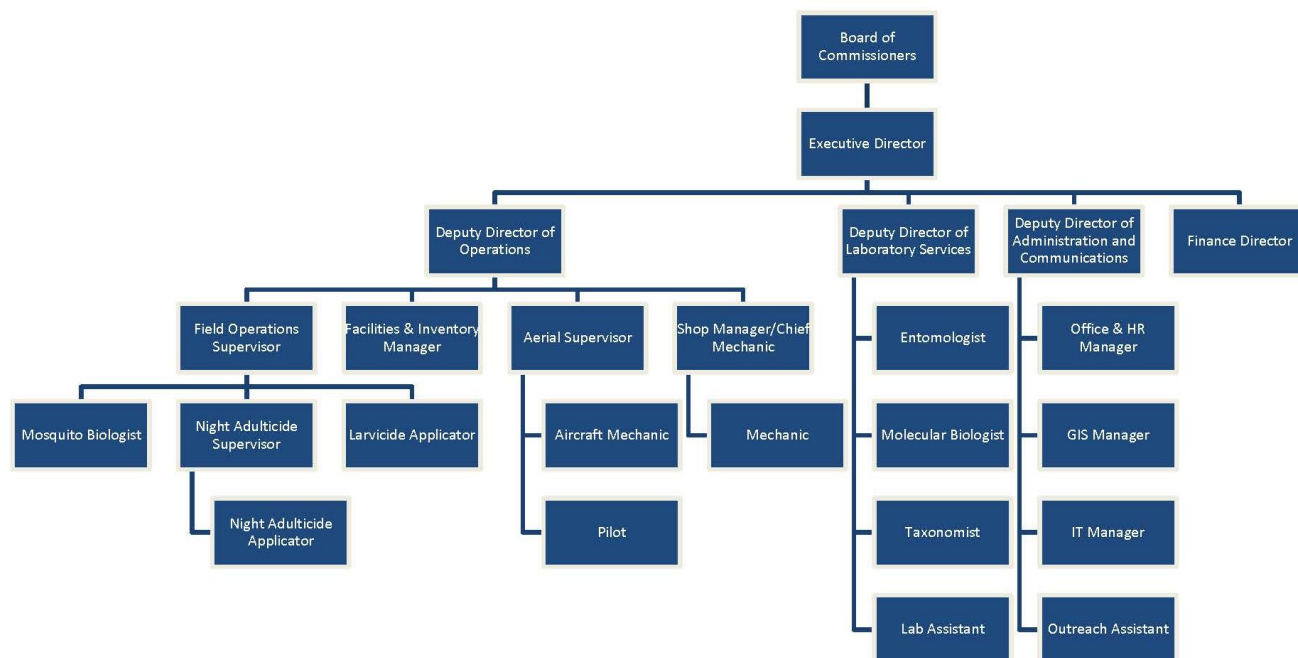
Table 8. STPMAD Staff Positions

• Commissioners • Executive Director • Finance Director • Deputy Director of Communications & Administration • Office & HR Manager • GIS Manager • IT Manager • Outreach Assistant • Facility & Inventory Manager	• Deputy Director of Operations • Field Operations Supervisor • Mosquito Biologist • Night Adulticide Supervisor • Adulticide Technician • Larvicide Applicator • Facilities & Inventory Manager • Aerial Supervisor • Aircraft Mechanic. • Pilot • Shop Manager • Mechanic	• Deputy Director of Laboratory Services • Entomologist • Molecular Biologist • Taxonomist • Lab Assistant • Student Intern
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Source: TBG Work product, St. Tammany Parish MAD

The district provides numerous opportunities for staff to participate in training and professional development and to ensure that staff receive annual compliance training required for the profession such as state pesticide applicator recertification. In addition, an annual training day takes place at the district for all staff. Individual staff may obtain additional continuing education units depending on their career path, and district staff reported that they are in the process of developing more formalized individual professional development processes. Senior leadership participate in annual trainings such as those provided by the American Mosquito Control Association (AMCA), to ensure that management is keeping up with national industry standards. The district should consider providing similar training to at least one Commissioner annually to ensure the technical expertise among board members is also current and to provide commissioners insights into the activities and programs of mosquito control districts around the country. AMCA meetings, for example, typically reserve time for concurrent sessions designed specifically for commissioners. In addition, the district has a well-developed internal IMM plan that provides commissioners and staff a comprehensive and thorough set of guidelines to support the daily activities and services provided by district staff. An organizational chart is provided in **Figure 4**.

Figure 4. STPMAD Organizational Chart



Source: St. Tammany Parish MAD

Analysis of Program Staffing Levels

The district's staffing levels have been relatively stable, fluctuating slightly from 2021 through 2026. To assess program staffing levels, TBG reviewed documentation provided by STPMAD and interviewed district staff. As noted, some of STPMAD's plans for operational efficiency include retaining staff, specifically leadership, and hiring another employee specializing in GIS. Due to some key leadership losses in 2026, district staffing levels may be expected to increase in the short run to fulfill these goals. In 2026, STPMAD had 52 paid, in-house staff members with a wide range of responsibilities and expertise compared to the 56 in house employees in 2025. The district also had 10 volunteers both in 2025 and 2026. There were no contracted staff employed by STPMAD from 2021 through 2026. Turnover was relatively low between 2022 and 2026, similar to other mosquito control districts of its size (**Table 9**).

Table 9. STPMAD Staff Counts

Employee Counts	2021	2022	2023	2024	2025	2026
Commissioners	5	5	5	5	5	5
Full Time	29	32	30	32	30	28
Part Time	32	28	24	27	26	24
Contracted	0	0	0	0	0	0
Volunteers	7	7	7	7	10	10
Vacancies	0	0	0	0	0	1
Total Filled Positions	61	60	54	59	56	52
Annual Turnover	N/A	-1	-6	5	-3	-4

Source: TBG Work product, St. Tammany Parish MAD

Overall, the district has maintained steady staffing levels with low attrition. District staff reported that approximately 57% of staff have been employed by the district for over five years. Recent concerns have included budget cuts that resulted in reductions to health care benefits for some staff and some pay cuts were made for larvicide and night truck drivers to align with market rates. As the district continues to manage its resources, it may consider temporary reductions in the percentage increases for senior staff salaries to allow for future salary increases of lower-level staff to prevent future attrition given recent budget cuts. In particular, larvicide technicians are likely to experience some level of burnout due to challenging outdoor work conditions, particularly after storms and the district should develop strategies to ensure retention of these staff into the future.

Equipment and Facilities

STPMAD's equipment and facilities are currently sufficient for operations and are serviced regularly to maintain and maximize efficiency in operational capabilities; recent capital outlay improvements have helped the district establish facilities that will aid in keeping pace with a growing district. To review the equipment and facility trends of the district, TBG analyzed documentation provided by STPMAD and interviewed staff. The district manages an operational aerial and ground fleet of mosquito management equipment in order to manage mosquitoes and monitor disease outbreak potential. The district faces challenges in surveillance and treatment of coastal marsh areas and remote inland woody areas that can be difficult to access.

The district acquired a helicopter in 2022 to increase efficiency of accessing swamps, woodlands, urban areas, and completing aerial larvicide treatments. The helicopter allows staff to access large areas of potential breeding inaccessible by other vehicles, and allows for a more targeted treatment approach, using less insecticide and therefore lowers input costs. The district's ability to own and manage its own

helicopter has several advantages, including quick response time ability to conduct post-storm treatment, which is not typically possible with contracted services that often have a 48-hour response time. The district is also geographically larger than some neighboring districts like Jefferson that use private contracted services but have a much smaller treatment area. STPMAD reports that the use of the helicopter varies from year to year, depending on treatment needs and staff carefully weigh the costs and benefits of different treatment techniques. For example, the helicopter requires a \$30,000 inspection at every 100 hours of use, which needs to be carefully considered and weighed against the benefits (i.e. cost savings in insecticide use). Additionally, in stakeholder interviews conducted for this review, stakeholders expressed the need for multiple aircraft so that during periods of heavy rain and natural disasters the district is not reliant on only one aircraft. The district should continue to carefully consider the usage of the helicopter among its fleet of vehicle options and maximize its usage given the investment but also balance it against usage/maintenance costs and per-acre treatment costs.

STPMAD owned one fixed wing aircraft, one rotary wing aircraft, three boats, 56 trucks and vans, and seven ATVs and other utility vehicles in 2026 (**Table 10**)⁷. Compared to other districts of similar size and scope reviewed by TBG in Florida, STPMAD's vehicle inventory is consistent and slightly more conservative. For example, several districts of comparable size and scope in Florida (Keys, Manatee, and Pasco) each have 2 to 4 helicopters and 39 to 73 trucks. In 2026, STPMAD owned 1 helicopter, 1 airplane, 3 boats, 56 trucks, and 7 ATVs, along with 288 pieces of equipment total composed of the following: 132 for field use, 44 for laboratory use, 92 for office use, 17 for the mechanic shop, and two for GIS applications. Equipment associated with the planned 2026 aircraft sale was also omitted from the 2026 total from Table 10. Equipment no longer used by the district prior to 2020 was excluded from the table below. Some taxpayers have suggested that the district may benefit from purchasing more drones to access remote areas, however according to district staff, drones are not effective for treating in all areas, particularly marsh habitats of large acreage. STPMAD owned two buildings in 2026, originally purchasing their facility and land in 2021. The district built their laboratory in 2024. The district's inventory of equipment and facilities is also consistent with the levels of assets held by other districts of comparable size and scope in Florida (Keys, Manatee, Pasco). For example, these districts have facilities with four to ten buildings on site, and similar quantities of field, lab, and office equipment. The capital outlay for helicopter and facility expansion are in line with the levels of resources needed by the comparable Florida districts to manage mosquitoes in the context of rapidly growing population and environmental challenges.

⁷ The district recently sold one fixed wing aircraft in 2026.

Table 10. District Vehicles, Equipment, and Facilities

	2020	2021	2022	2023	2024	2025	2026
Vehicles	47	49	51	55	69	74	73
Airplanes	2	2	2	2	2	2	1
Helicopters	0	0	1	1	1	1	1
Boats	3	3	3	3	3	3	3
Trucks and Vans	31	33	34	37	50	56	56
ATVs and Utility Vehicles	6	6	6	7	8	7	7
Equipment	160	174	178	209	270	289	284
Field Equipment	86	95	99	108	131	137	132
Lab Equipment	18	19	20	35	41	44	44
Office Equipment	46	50	50	54	83	92	92
Shop Equipment	10	10	10	13	16	17	17
GIS Equipment	0	0	0	2	2	2	2
Facilities	2	2	2	2	3	3	3
Buildings	2	2	2	2	3	3	3

Source: TBG Work product, St. Tammany Parish MAD

STPMAD has several types of mosquito traps for surveillance. According to interviews, the district does not have a sentinel chicken program due to the ineffectiveness of this type of monitoring in their area. By the time arbovirus is identified in chickens, it has likely already spread to humans and is therefore not an effective monitoring technique for this region. The supply of mosquito traps has increased from 229 in 2021 to 290 in 2026 (.

Table 11).

Table 11. Surveillance Equipment

Equipment	2021	2022	2023	2024	2025	2026
Mosquito Traps	229	251	300	290	290	290
No light CDC traps	64	88	104	104	104	104
Egg Trap (Gravid Pan Only)	50	50	50	50	50	50
Ovi Trap Cups	100	100	100	100	100	100
Midge Traps	0	0	0	0	10	10
Emergence Traps	10	10	36	36	36	36
BG Counter Traps	5	3	10	0	0	0

Source: TBG Work product, St. Tammany Parish MAD

c. Goals, Objectives, and Performance Measures and Standards

STPMAD has established broad organizational goals that support its mission of protecting public health and quality of life through mosquito control activities. These goals reflect in the district's mission, action, vision, and values statements and are supported by operational performance measures and developmental goals used to evaluate district activities and service delivery.

To assess the district's goals, objectives, performance measures, and performance standards, TBG reviewed the district's founding documents, annual reports, operational performance measures, financial audits, strategic planning documents, and other relevant records provided by the district. TBG reviewed available documentation and performance data spanning calendar years 2020 through 2026, where available, including operational reports and stakeholder interview information. TBG also evaluated the district's progress toward achieving its stated goals and objectives through an analysis of performance results, operational activities, and reported outcomes.

Goals and Objectives

STPMAD has defined several broad goals that provide direction for district activities and support its overall purpose of protecting public health and quality of life. These goals are articulated through the district's mission, action, vision, and values statements, which guide operational decision-making and program implementation. STPMAD's goals include the following:

- **Mission:** St. Tammany Parish Mosquito Abatement District's (STPMAD) mission is to protect the health and quality of life of the residents of St. Tammany Parish by minimizing the risk of mosquito-transmitted diseases and managing nuisance mosquitoes to a tolerable level.
- **Action:** We achieve this mission using an integrated mosquito management approach. This approach includes monitoring mosquito abundance and indicators of mosquito-transmitted pathogens, controlling larval and adult mosquitoes with environmental modification or the selective use of public health insecticides, educating the public, and continuously evaluating our effectiveness.
- **Vision:** We envision a community where residents and visitors enjoy outdoor activities with minimal annoyance from mosquitoes and the risk of diseases they can transmit.
- **Values:** The core values of St. Tammany Parish Mosquito Abatement are Service and Integrity. All operations are rooted in these values to put service to others above ourselves, and to do so with the highest level of integrity in scientific and public accountability.

STPMAD has defined numerous specific objectives across its functional areas for 2026, which include operational service goals and developmental goals. STPMAD currently has 48 objectives across both of its functional areas which include day-to-day operations within the aerial and field fleets, community outreach and education, research and development, and administration processes. The objectives are

adequately defined, clearly stated, and appropriate for the district's purpose. **Table 12** presents a summary of the core operational service goals established by the district.

Table 12. Operational Service Goals for St. Tammany Parish MAD

Topic Area	Objectives
Operational Service Goals	High quality responsive service to residents reporting mosquito infestations. 75% of requests for service answered within 24 hours. 100% within 72 hours. - An average of four out of five stars feedback rating for residential property inspections.
	Minimize response time from triggering mosquito indicators to treatment. - Laboratory Trap Time 90% of mosquito pools identified to species and tested for arboviruses within 1 day of field collection. 100% of pools identified to species and tested for arboviruses within 3 days. - Operational Treatment Response 90% of zones requiring mitigation due to indicators triggering predetermined thresholds receive treatments within 2 operational days (weather permitting). 100% within 3 operational days. 80% of zones requiring mitigation due to arbovirus-infected mosquito pools receive treatments (weather permitting) within 1 operational day. 100% within 2 operational days.
	Continuous year-round monitoring of arbovirus and mosquito populations. - Mosquito traps placed in each zone across St. Tammany Parish at least every 14 days weather permitting. - Adult mosquito inspections - Landing rates when a low arbovirus risk occurs, covering 75% of parish in a 7-day period.
	Maintain an operational aerial and ground fleet of mosquito management equipment. - STPMAD owned aircraft are ready for operational missions at least 80% of the year. - At least one STPMAD owned aircraft ready for operational missions 98% of the year. - STPMAD aircraft have flow rates calibrated at least once per year. - Swath-width and droplet characterization conducted every year for each aircraft. - All ground spray systems (low volume and ultra-low volume systems) are calibrated once per year. - Larvicide habitat monitoring and treatment covering 90% of sewage-polluted ditch lines within the seasonal development larvicide window.
	Develop a staff of mosquito abatement professionals to optimize team service capacity and personal fulfillment. - All ground ultra-low volume (ULV) adulticide applicators receive at least 2 hours of training per year. - All larvicide applicators receive at least 6 hours of training per year.

Topic Area	Objectives
	- All mosquito biologists and other personnel applying, mixing, or loading insecticides receive at least 6 hours of training and an additional 3 hours of continuing education per year. - All supervisors and administrative staff receive at least 6 hours of training and an additional 6 hours of continuing education per year. - All staff members receive an annual performance evaluation. - All full-time staff have written a professional development plan. Evaluate insecticide efficacy to ensure optimal performance of operational interventions. - Perform topical insecticide resistance assays on each adult mosquito insecticide used at least once per year to determine mosquito mortality efficacy at the diagnostic dose. - Monitor the interannual resistance profile of adult mosquitoes in at least five locations throughout St. Tammany Parish. Educate and inform St. Tammany Parish residents about mosquito and arbovirus prevention measures and the services provided by Mosquito Abatement. - Conduct direct outreach to 60% of St. Tammany Parish households through a combination of direct mailers and in-person property inspections. - Achieve high-quality engagement to at least 40,000 contacts through one-on-one interactions at events, school programs, open houses, property inspections and presentations. Create a balanced budget that conforms to best practices according to government accounting standards (GASB). - Budget to actual spending annual expenditures within 5% of budgeted spending plan. - Annual financial and statewide agreed upon procedures audit with no findings or recommendations.

Source: TBG Work product, St. Tammany Parish MAD

In addition to the core operational services, development projects are identified by the district to enhance efficiency of the core operational service mission. **Table 13** below presents the developmental goals stated by STPMAD.

Table 13. Developmental Goals for St. Tammany Parish MAD

Topic Area	Objectives
Aerial Operations	- Conduct a droplet characterization of Bell 407 adulticide spray system to create an optimization file for Imperium. - Sale of Britten Norman Islander.
Field Operations	- Installation and deployment of dashcam for transparency and safety. - Increase licensed Unmanned Aerial Systems pilots. - Assist with the evaluation of floodwater habitat models. - Eliminate the use of the insecticide Resmethrin for ground ULV applications
Outreach & Education	- Host a facility open house. - Execute an outreach campaign to get millage renewal passed. - Create a website and mobile application for onsite wastewater treatment system awareness and maintenance. - Produce a podcast to promote awareness of onsite wastewater treatment system maintenance. - Facilitate in-person water quality citizen's groups. - Enhance vector control staff training through newsletters and workshops by collaborating with the CDC-funded Gulf South Vector group.
Research & Development	- Assess the species and temporal distributions of ticks and biting midges in St. Tammany Parish. - Evaluate external insecticides and repellents. - Assess the accuracy of woodland mosquito models by integrating real time water level data with digital elevation models. - Use of floodwater models by field biologists to diagnose mosquito production sites. - Develop the procedure needed to automate and treat "mosquito need surfaces" for 2027 implementation.
Administrative	- Conduct Strengths, Weaknesses, Opportunities, and Threats analysis. - Develop a new five-year plan. - Create core services performance measures. - Conduct an employee satisfaction survey. - Renew 2027-2037 Millage. - Reduce spending by 5%.

Source: TBG Work product, St. Tammany Parish MAD

Strategic or Other Formal Plans for the District's Future

STPMAD has created a five-year strategic plan outlining its goals for 2021-26, setting goals and objectives and steps to achieve them. To assess the formal plans for STPMAD's future, TBG reviewed documentation provided by STPMAD to determine the full scope of the strategic plan. STPMAD has a strategic plan in place for 2021-26, with the main purpose of accomplishing the following:

1. Leverage a multi-frame aerial fleet (including drones) for enhanced prescriptive management

of larval and adult mosquitoes.

2. Develop woodland habitat mosquito predictive modelling to improve management of larval populations.
3. Develop and implement a parish-wide plan for the control of invasive aquatic plants that host mosquitoes.
4. Conduct applied research, technological innovation, and advocacy to mitigate the impacts of onsite wastewater treatment systems.
5. Build laboratory and training capacity within the STPMAD campus to enhance operations efficiency.
6. Additions in 2025:
 - a. Leverage and develop new and emerging technologies to create safer, more efficient, more environmentally sensitive, and less costly services to St. Tammany Parish residents.
 - b. Complete a comprehensive risk assessment process to evaluate risks and develop mitigation plans for existing and emerging vector-borne disease threats to St. Tammany Parish residents.
 - c. Develop innovative ways to communicate existing services and educate St. Tammany Parish residents to inform them of vector-borne pathogen risks and prevention techniques.

This strategic plan includes an action plan as well as a financial millage plan and details the purpose of each of the departments of the district. The departments include Aerial Operations, Ground Operations, Inspection and Surveillance, Mechanic Shop, IT, Facilities, Administration, Laboratory, Public Information, and Research. STPMAD is also in the middle of refurbishing its aerial fleet, as one of the aircraft they use is severely outdated and harder to source parts for as they age. The district's Britten Norman Islander airplane is currently in the process of being sold.

Analysis of Management Reports/Data and Performance Information

Documentation shows regular oversight and monitoring of district goals by the STPMAD Board of Commissioners. To assess management reporting and performance information, TBG reviewed documentation provided by STPMAD as well as Louisiana Department of Health (LDH) reports, which include operational results for St. Tammany. Extensive information was made available by STPMAD's website, and board and workshop packets also include detailed information. The Board minutes and agendas reviewed reflect regular monitoring of performance, identification of issues as they arise, and discussion of opportunities to improve efficiency and effectiveness. For example, the April 15, 2026, meeting minutes detailed a review of the newly produced Treasure's Report and Assigned Funds Plan, a discussion of millage recommendations, reports of employee incidents, and a discussion of employee benefits, among other topics.

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

STPMAD demonstrates effective and efficient management of program costs and routinely monitors programs to ensure effectiveness and improve the quality of program activities. To assess cost, timing, and quality of program efforts, TBG reviewed documentation provided by the district, publicly available data and reports, and interviewed district staff.

STPMAD has demonstrated effective management of costs, as evidenced by the historical trends showing that the district balances its revenues and expenses well, and that the district lowered millage rates while keeping revenues in excess of expenditures by over \$0.7 million for 2020 through 2021. From 2022-2026, expenditures have outpaced revenues; however, much of the expenditures were in long-term investments that used previous reserves, thus the change in the district's net balance remained positive through 2024. Spending in 2025 did result in a negative net balance, which may be associated with the lower millage rate and population size of the parish. The district also reported that it continuously monitors its program to ensure that its activities are effective. Examples include the monitoring of adulticide and larvicide operations and of insect resistance to specific chemicals, made available to the public through their Integrated Mosquito Management Plan, as well as the monitoring of the district's aerial fleet. The district also maintains its own lab, which allows for same day results, the treatment of areas within 48 hours of identification of arbovirus positive mosquitoes, research into insecticide resistance, and calibration of equipment.

Performance Measures and Standards

STPMAD monitors performance using information on responses to citizen requests, timeliness of in-house arbovirus testing, frequency of trap placement, reductions in adult and larval mosquito populations after mosquito control efforts are made. Through STPMAD's recent strategic planning process, it developed clear, measurable goals and objectives as described in the previous section. Currently, STPMAD monitors performance using the following performance standards and measures, which have been put in place during the past calendar year.

1. **Standard:** Address citizen requests for mosquito control efforts in a timely manner.
Measure: Number of service requests received and addressed with improved average response time, and an average ranking out of five stars.
2. **Standard:** Minimize response time from triggering mosquito indicators to treatment (within 24-72 hours of placement of a citizen request).
Measure: Average number of days to conduct tests of mosquitoes from the district's mosquito pools for arbovirus presence and necessary treatment.

3. **Standard:** Continuous year-round monitoring of arbovirus and mosquito populations.
Measure: Frequency of mosquito traps placed in each zone.
4. **Standard:** Maintain an operational aerial and ground fleet of mosquito management equipment.
Measure: Readiness of aircraft throughout the year, and frequency of calibration of aircraft and ground sprayers. Percentage of larvicide habitats in sewage-polluted ditch lines treated.
5. **Standard:** Develop a staff of mosquito abatement professionals to optimize team service capacity and personal fulfillment.
Measure: Annual minimum training hours for all employees, annual performance reviews, and professional development plans.
6. **Standard:** Evaluate insecticide efficiency to ensure optimal performance of operational interventions.
Measure: Annual insecticide resistance assays on each insecticide used to test mosquito mortality and number of locations monitoring interannual resistance profiles.
7. **Standard:** Educate and inform residents about mosquito and arbovirus prevention measures and the district's services.
Measure: Number of contacts with one-on-one interactions at events, schools, open houses, property inspections and presentations.
8. **Standard:** Create a balanced budget that conforms to government accounting standards.
Measure: Annual audits and percent difference in actual spending from budgeted spending.

These eight core performance measures are appropriate for the scale and scope of STPMAD's operations. However, because the district only recently formalized these performance standards and measures, insufficient historical data are available to fully assess performance over the review period. As the district continues to implement these measures, it should consistently monitor, document, and report performance to enable management and the Board to effectively track progress toward achieving its operational goals.

Analysis of Goals, Objectives, and Performance Measures

STPMAD has established clearly defined goals and objectives and has ample performance standards and measures; lack of data prevents full performance assessment as the district just recently began implementing their goals and measures to record them. Local arbovirus counts remained steady in St. Tammany but spiked in calendar year 2025 over the review period. TBG reviewed STPMAD's 2021-26

Strategic Plan, 2026 Operational Performance Measures and Developmental Goals, and interviewed staff. As noted, the district has stated goals and objectives, but it needs continued monitoring and tracking performance measures towards their objectives to gather data over time to monitor progress.

The district reported that counts of arbovirus cases acquired in Louisiana and identified in the district are not part of its performance standards or measures. TBG reviewed Louisiana Department of Health (LDH) reports on arbovirus case counts for the past six calendar years to determine the counts of travel-related cases and cases originating in the district. Cases originating in the district increased over the review period from one case acquired in Louisiana in calendar year 2020 to 11 in calendar year 2025, and travel-related cases increased from zero in all preceding years to one in 2025. No deaths occurred as a result of infections during the review period. STPMAD analyzes LDH reports to measure the success of the district's disease prevention efforts.

Table 14 illustrates performance measures that were able to be quantified by STPMAD for the past six calendar years, as applicable, including documented human arbovirus cases from LDH and district service calls and responses.

Table 14. Performance Measures for STPMAD

Performance Measures	2020	2021	2022	2023	2024	2025
Arbovirus Cases (St. Tammany)	1	2	4	3	1	11
Arbovirus Cases (Louisiana-Travel)	0	0	0	0	0	1
Arbovirus Deaths	0	0	0	0	0	0
Service Requests	959	1,503	1,028	1,002	1,627	1,048
Service Responses	959	1,503	1,028	1,002	1,627	1,048

Source: TBG Work product, St. Tammany Parish MAD; LDH

d. Previous Performance Reviews and Stakeholder Perceptions of the District's Performance

Based on the findings of this review, STPMAD is viewed very favorably by the public and other stakeholders.

TBG reviewed prior audit findings, performance reports, interviewed stakeholders, and conducted a stakeholder survey. Findings indicate strong positive support across multiple types of stakeholders and the general public for the district.

Financial Audit Findings

STPMAD audits report no material findings and have not found any weaknesses in internal controls or financial audits. TBG reviewed STPMAD's financial audits from CYs 2020-25. Audits found no issues pertaining to material weaknesses and internal controls. At the time of this writing, the CY 2026 audit had not been released, but STPMAD has historically upheld a high standard of reporting. TBG reviewed STPMAD's FY 2020-2025 independent financial audits, which reported an unmodified opinion on the district's financial statements. The audit found no material weaknesses in internal control, no significant deficiencies, and no instances of noncompliance with applicable laws, regulations, contracts, or grant agreements. STPMAD's revenues cover costs. The audits found that STPMAD's financial statements had no negative findings and represented the district's financial position well.

Previous Performance Reviews

TBG did not identify any prior formal performance reviews of STPMAD comparable to this evaluation, and no resident feedback surveys were provided by the district.

Stakeholder Interviews

Perceptions of STPMAD's performance by stakeholders are generally very positive. STPMAD has established numerous partnerships and maintains ongoing working relationships with state and local government entities, nonprofit and educational organizations, community and civic groups, and local schools. TBG interviewed 20 stakeholders including Directors of other mosquito control districts and municipal mosquito control operations, non-profit organization leaders, state agency officials, members of the STPMAD Board of Commissioners, St. Tammany Parish Council members, and residents including a West Nile virus survivor. Interviews were conducted using a structured question format to elicit perceptions and opinions of interviewees of the district's performance.

Overall stakeholders reported positive feedback regarding the district's operations, with several stating that STPMAD is the most efficient and best suited entity to handle mosquito control service delivery for the parish. Some reported criticisms focused on the desire for more spraying and to revert to previous chemical usage as some recent feedback highlighted a perceived increase in mosquito activity this year. Feedback from stakeholders indicated support for the district as a highly effective entity that should be preserved by both residents and stakeholders. Stakeholders in the mosquito control industry highlighted STPMAD as one of the most effective mosquito control programs in the region. Most stakeholders considered STPMAD to be a leader among mosquito control programs that effectively meet goals and objectives and is the most cost-effective option to deliver mosquito abatement services.

Many other mosquito districts face challenges in building successful working relationships and partnerships with environmental organizations due to conflicting views on insecticide and pesticide impacts; however, STPMAD has successfully developed positive working relationships with several local environmental groups. Stakeholders interviewed reported that the successful partnerships have been

facilitated by focusing on a common goal of reducing pollution in the district from sewage ditches, which would also reduce mosquito control treatment needs and costs. STPMAD continues to seek opportunities to partner with other organizations to identify strategies for improving the local environmental quality while addressing the mosquito control challenge.

Stakeholder Survey

Survey results indicate positive views of the district’s activities and service provision; a small proportion of negative comments appear to be from residents who may have a misunderstanding of district services. TBG collected stakeholder feedback to assess the St. Tammany Parish Mosquito Abatement District’s performance and responsiveness to community needs. The survey was designed to obtain direct input from community members on district effectiveness and efficiency in the delivery of mosquito control services and to identify potential opportunities for improvement. The survey was sent out to 267 participants, including a mix of stakeholders to the district, residents of the district, and government members of St. Tammany Parish. There were 71 responses in total, and 67 responses remaining after the screening process for a response rate of 27%. Four responses were omitted due to insufficient data. The respondents were classified into 9 stakeholder categories, including St. Tammany Parish Resident, St. Tammany Parish Elected Official, State Agency Staff, Mosquito/Pest Control District Staff, Other Local Government Staff, Non-profit Organization Staff, Academic/Educational Institution Faculty or Staff, Recipient of St. Tammany Parish Mosquito Abatement District Services, and Other. **Table 15** shows the share of each stakeholder group in the sample. Residents comprised a significant majority of survey respondents with smaller portions coming from various other groups.

Table 15. STPMAD Stakeholder Survey Respondents by Type

Stakeholder Group	Response Count	% Response Share	Sent To Count	% Sent To Share
St. Tammany Parish Resident	46	69%	213	80%
St. Tammany Parish Elected Official	5	7%	21	8%
State Agency Staff	0	0%	4	2%
Mosquito/Pest Control District Staff	4	6%	10	4%
Other Local Government Staff	3	4%	10	4%
Non-profit Organization Staff	2	3%	3	1%
Academic/Educational Institution Faculty or Staff	5	7%	6	2%
Recipient of STPMAD Services	0	0%	0	0%
Other	2	3%	0	0%
Total	67	100%	267	100%

Note: The St. Tammany Parish Elected Official category additionally includes appointed officials in the Parish. The State Agency Staff category includes a federal employee. The Other category was used when a stakeholder group could not be confirmed.

Source: TBG work product.

Most (76%) survey respondents feel the district is very to extremely effective in providing mosquito control services to the parish. Table 16 presents information on the breakdown of percentage share of responses to perceived effectiveness of the district. Extremely effective and very effective comprised 76% of total responses. Only 13% of respondents reported that they think the district is minimally effective or not effective, one of which painted the district’s activities in positive light highlighting their frequent spraying and presence throughout the parish but citing the challenges of eliminating all of the mosquitoes. These results are consistent with the recent election results where St. Tammany Parish residents voted 69% in favor of the district’s 10-year millage renewal⁸.

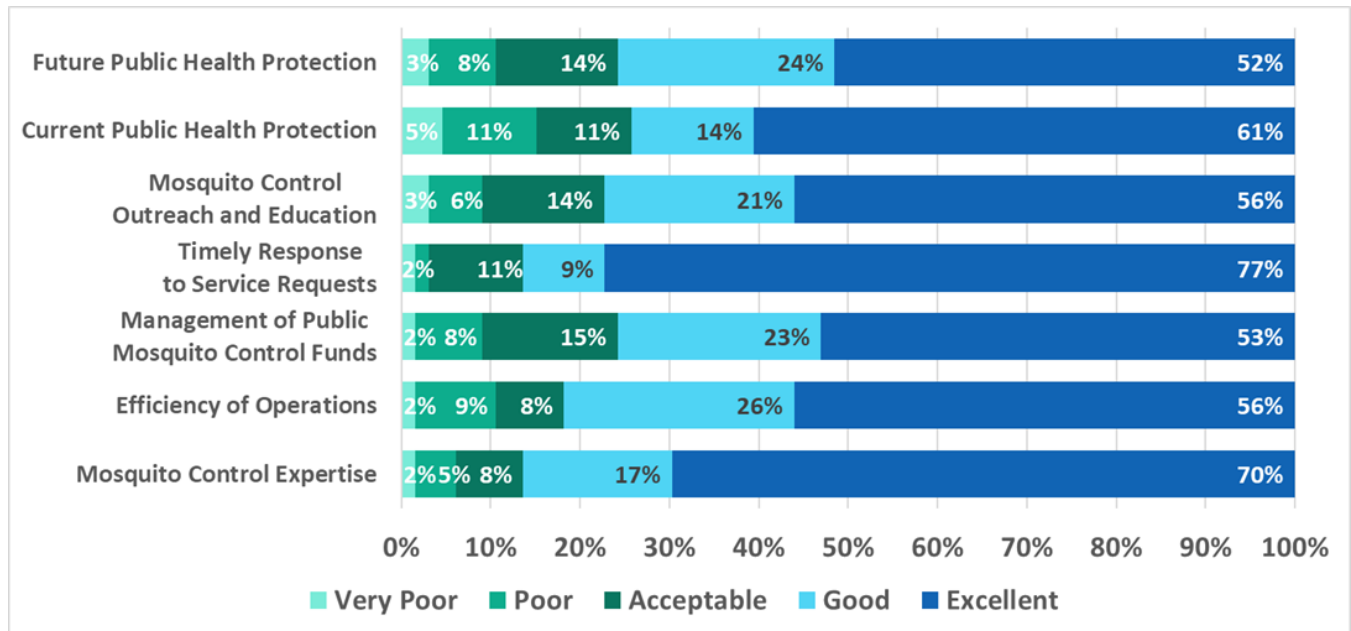
Table 16. STPMAD Stakeholder Survey Effectiveness Rating

Overall	Count	% Share
Not Effective	1	1%
Minimally Effective	8	12%
Somewhat Effective	7	10%
Very Effective	16	24%
Extremely Effective	35	52%
Total Responses	67	100%

Source: TBG work product.

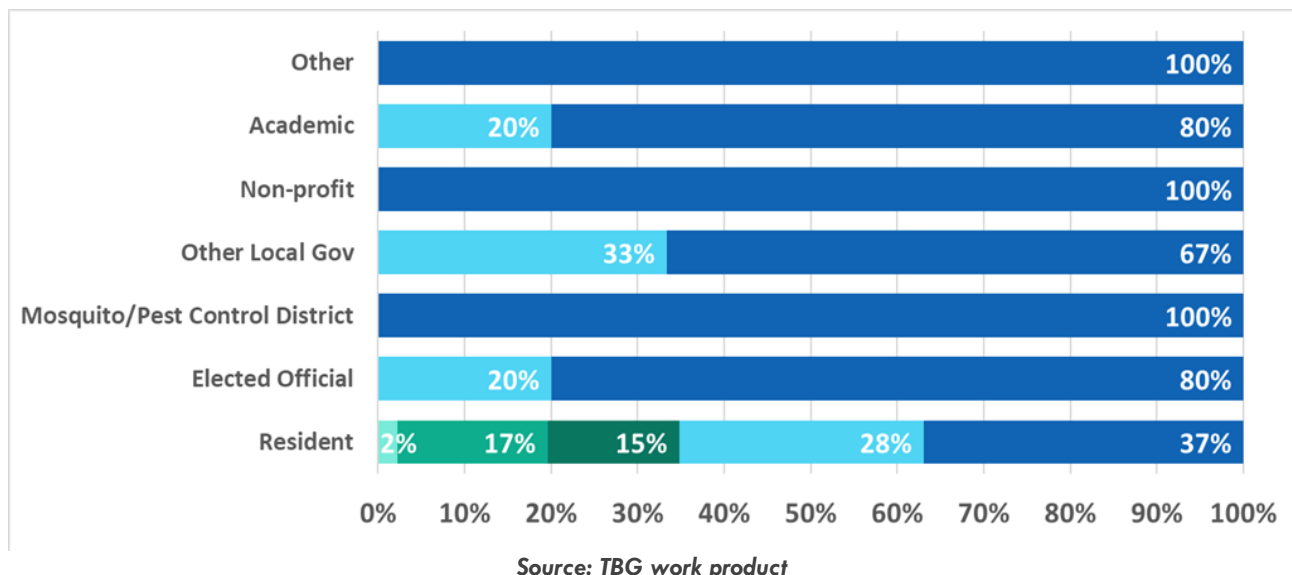
The majority of survey respondents across all stakeholder categories view the district’s service provision very favorably. The effectiveness of the district’s services (spraying, larvicide/adulticide treatment, disease prevention) throughout the parish was ranked by 67 participants using a scale of 1 to 5; 1 being the least effective, and 5 being the most effective. The district’s performance in several specific areas of mosquito control was also ranked by respondents, where “Excellent” was the highest rating and “Very Poor” was the lowest rating. **Figure 5** shows the percent share of the effectiveness rankings by stakeholder group. Survey responses were overwhelmingly positive about all categories with people scoring STPMAD as excellent in all categories. Mosquito control expertise and their timely response to service requests both scored excellent with over 70% share of responses. Few responses came in as poor or very poor, with current public health protection having the highest share of poor or very poor responses, but also the third highest share of excellent responses.

⁸ <https://voterportal.sos.la.gov/static/2026-06-27/resultsRace/52>

Figure 5. STPMAD Stakeholder Survey Mosquito Control Rating

Source: TBG work product.

Negative perceptions of the district are primarily from residents. Figure 6 breaks down overall response scoring based on stakeholder group. Most respondents across all stakeholder groups had high opinions of STPMAD scoring the district as either very effective or extremely effective at a 100% rate. Residents, while still mostly positive, had a higher proportion of respondents who rated the district as somewhat effective, minimally effective, or not effective, amounting to about 35% of residents. Common complaints included a high presence of mosquitoes and desire for more spraying, a lack of visibility about

Figure 6. STPMAD Stakeholder Survey Mosquito Control Rating by Respondent Type

Source: TBG work product

aerial and truck spraying, complaints about the drainage issues in the parish, and dissatisfaction with the timing of spraying primarily before a rain.

Open-ended responses from 65 participants were analyzed to collect additional stakeholder input on potential improvements and alternative methods that the district could adopt in the future. Similar to the interviews, the surveys came back with overwhelmingly positive views of STPMAD's effectiveness. Some negative feedback was reported in the survey open-ended responses, for example respondents requested more service, whether it was wanting more spraying to be done, one claim of an unfulfilled service requests, more aerial spraying, complaints of significant ongoing mosquito activity, and spraying during the night when people were not outside.

Other complaints include requests for usage of chemicals that are less toxic to people, pets, and other bugs, more home inspections, complaints of digging ditches too deep that water cannot flow, wanting more preventative measures in standing water, targeted responses to resident complaints and mosquito hotspots, a desire for greater transparency and reporting of more information to the public, and a desire for the planes to fly more and secure the pilots needed for them.

However, no complaints or requests came from believing the district should be dissolved or restructured into a municipal government run program. People generally wanted more information, more spraying, more activity with trucks and planes, and more explanations for various practices. Some of these responses, such as fears about the chemicals used in spraying highlights the need for renewed efforts in public education on mosquito control services. Significant numbers of positive comments praising the district for their transparency, effectiveness, knowledge, helpfulness, and resources were also present and greatly outnumbered the negative or more critical comments.

5. Cost-Benefit Analysis

A cost-benefit analysis (CBA) was conducted to evaluate the economic, environmental, and social implications of STPMAD's mosquito control operations by observing total operational costs compared to the benefits gleamed from the program. Recorded benefits and costs are presented in 2025 dollars, reflecting the most recent full calendar year for which complete data are available and ensuring consistency with the district's reported values. All costs and benefits were evaluated over a 5-year and 10-year period using a standard 7% discount rate.⁹

⁹ The discount rate accounts for the time value of money and converts the value of future cash flows into a value at the present time (<https://www.cbo.gov/publication/60815>).

TBG conducted CBA's to compare the relative costs and benefits of two scenarios: one in which there are no publicly funded mosquito control services provided through the STPMAD, and one in which such services are regularly provided and supported through public funds. In the scenario without STPMAD's mosquito control program, costs exceed benefits, resulting in a BCR of 0.25; this means that for every \$1 in costs incurred, approximately \$0.25 in community benefits are generated. A BCR less than one signifies an investment that is not cost-effective, as the costs exceed the benefits.

In the scenario where STPMAD provides mosquito control services, these services achieve a Benefit-Cost Ratio (BCR) of 3.9 at a 7% discount rate. The BCR with the mosquito control services provided by STPMAD is above 1.0, meaning benefits exceed costs and thereby signify a cost-effective investment; for every \$1 spent, approximately \$3.92 in community benefits are provided. See **Table 17** below for a breakdown of the costs and benefits associated with an existing STPMAD mosquito control program, based on a five-year time period and a ten-year time period.

Table 17. Benefit Cost Analysis of STPMAD Services As-Is, 7% Discount Rate

Costs	Five-Year Time Period	Ten-Year Time Period
Administrative Costs	\$3,077,400	\$5,271,600
Direct Costs	\$35,143,400	\$60,200,100
Total Costs	\$38,220,800	\$65,471,700
Benefits		
Quality of Life/Outdoor Experience	\$88,811,500	\$152,132,800
Avoided Medical Costs from West Nile Fever	\$17,326,500	\$29,680,100
Avoided Medical Costs from West Nile Neuroinvasive Disease	\$3,617,600	\$6,196,900
Avoided Costs from Private Mosquito Control for Households	\$40,188,600	\$68,842,600
Total Benefits	\$149,944,200	\$256,852,400
Benefit-Cost Ratio	3.92	3.92

Source: TBG Analysis, STPMAD Data

Costs

Historical cost data was collected through annual audit reports and cost breakdowns provided by the district. Cost data includes administrative costs (salaries, employee benefits, travel costs, operating costs, and supplies), direct program costs (personal services, operating costs, travel costs, supplies, and capital outlay), and contracted services. The annual cost value derived from the district's monthly operating budgets is \$9.3 million. Total costs for STPMAD over a five-year time horizon are \$38.2 million and \$65.5 million over a ten-year time horizon.

Benefits

The analysis considered three benefit streams: improved quality of life and outdoor experience, avoided medical costs associated with mosquito-borne illnesses, and avoided costs associated with private mosquito control for households. Where ranges of values were available, conservative estimates were used for all non-market costs and benefits, and should be considered a lower bound. Total Benefits from STPMAD operations are \$149.9 million over a five-year time horizon and \$256.9 million over a ten-year time horizon, equaling out to \$111.7 million in net benefits and \$191.4 million, respectively.

Non-market values were considered in this analysis. Nonmarket goods refer to things you cannot purchase in a store, such as quality of life, or clean air, or healthy ecosystems. Nonmarket goods are quantified using published economic measures of the public's valuation for such items. For non-market values, and when using a Benefit Transfer method as in this study, different options for non-market willingness-to-pay (WTP) values may exist for each strategy. TBG used professional judgement to select the most appropriate and applicable values due to factors such as geographic location and year published, with more recent studies being preferable. The measures chosen considered the specific options available to St. Tammany Parish. The specifics of each benefit stream are described in the following sections.

Quality of Life & Recreation

Mosquitoes create nuisance for residents during periods of higher outdoor recreation, and thus increased presence from the absence of active mosquito abatement would result in residents spending less time outdoors or experience reduced enjoyment of yards, patios, pools, parks, etc. The presence of a mosquito abatement program provides enhanced quality of life and outdoor experience benefits for residents by reducing the number of mosquitoes. Dickinson and Paskewitz (2012)¹⁰ found that on average, households are willing-to-pay \$206.13 to reduce the presence of nuisance mosquitoes and therefore increase recreation and outdoor opportunities. This was applied to the total number of households within the parish, 105,082¹¹ to estimate the total benefits gleaned from reductions in nuisance mosquitoes and increased recreation activity when mosquito control activities are present. Benefits associated with quality of life and recreation total \$88.8 million over a five-year time horizon and \$152.1 million over a 10-year time horizon.

¹⁰ Dickinson, K., & Paskewitz, S. (2012). Willingness to pay for mosquito control: how important is West Nile virus risk compared to the nuisance of mosquitoes?. *Vector borne and zoonotic diseases* (Larchmont, N.Y.), 12(10), 886–892. <https://doi.org/10.1089/vbz.2011.0810>

¹¹ United States Census Bureau. (2026). County population totals and components of change: 2020-2025. <https://www.census.gov/data/tables/time-series/demo/popest/2020s-counties-total.html>

Avoided Medical Costs

Mosquito abatement activities help to reduce mosquito-related illnesses, and thus in the absence of a consistent framework, there is a greater probability of disease prevalence and related medical reaction. Residents benefit from avoided medical costs associated with vector-borne diseases including West Nile Fever (WNF) and West Nile Neuroinvasive Disease (WNND). Due to differences in health severity, WNF and WNND are treated separately in estimating the medical costs prevented through mosquito control. To estimate the avoided medical costs associated with reductions in mosquitoes, the CBA assessed the number of avoided cases and annual incidence rates of WNF and WNND within St. Tammany Parish using historical Louisiana Department of Health (LDH) records¹². LDH only reports incidents of locally acquired WNF and WNND, and thus is considered a lower bound estimate of disease prevalence. WNF typically is accompanied with flu-like symptoms and may require primary care, while WNND is more severe and generally requires hospitalization, specialist care, long-term care, and, in some cases, results in death. The historical average rate of disease incidents was applied to the total number of residents within the district in 2025. In the absence of mosquito control, there is expected to be an increase in disease rates, with a literature value stating that the odds of infection after spraying were six times higher in untreated areas than in treated areas.¹³ While the LDH reports a 10-year average of 0.8 cases for WNF, it is assumed to be under-reported. The Center for Disease Control and Prevention (CDC) states that for every WNND case reported, there are 30 to 70 non-neuroinvasive disease cases that occur.¹⁴ The number of WNF cases within the district was scaled relative to the total number of WNND cases by using a midpoint value of 50 cases to account for its higher frequency of occurrence and potential underreporting. The resulting number of avoided cases, 636 for WNF and 13 for WNND, was used to estimate the associated medical cost savings. Average per-patient medical costs of approximately \$6,639 for WNF and \$69,309 for WNND were derived from literature values¹⁵ and were multiplied by the number of avoided cases due to the

¹² Louisiana Department of Health. (n.d.). Arbovirus surveillance reports. <https://ldh.la.gov/resources?cat=157&d=5&y=0&s=0&q=Arbovirus>

¹³ Carney, R. M., Husted, S., Jean, C., Glaser, C., & Kramer, V. (2008). Efficacy of aerial spraying of mosquito adulticide in reducing incidence of West Nile Virus, California, 2005. *Emerging infectious diseases*, 14(5), 747–754. <https://doi.org/10.3201/eid1405.071347>

¹⁴ Padda H., Jacobs D., Gould C. V., Sutter R., Lehman J., Staples, J. E., & Lyons, S. (2025). West nile virus and other nationally notifiable arboviral diseases – United States, 2023. *Morbidity and Mortality Weekly Report*, 74(21), 358-364. <http://dx.doi.org/10.15585/mmwr.mm7421a1>

¹⁵ See Barber, L. M., Schleier, J. J., 3rd, & Peterson, R. K. (2010). Economic cost analysis of West Nile virus outbreak, Sacramento County, California, USA, 2005. *Emerging infectious diseases*, 16(3), 480–486. <https://doi.org/10.3201/eid1603.090667>; Staples, J. E., Shankar, M. B., Sejvar, J. J., Meltzer, M. I., & Fischer, M. (2014). Initial and long-term costs of patients hospitalized with West Nile virus disease. *The American journal of tropical medicine and hygiene*, 90(3), 402–409. <https://doi.org/10.4269/ajtmh.13-0206>; and Zohrabian, A., Meltzer, M. I., Ratard, R., Billah, K.,

presence of mosquito control services by STPMAD. Associated benefits of avoided medical costs for WNF are \$17.3 million and \$3.6 million for WNND over a 5-year time horizon and \$29.7 million for WNF and \$6.2 million for WNND over a ten-year time horizon. The avoided medical costs for WNF and WNND are conservative estimates as they are based on initial medical costs and excludes costs associated with mortality.

Avoided Cost of Private Mosquito Control

Some households purchase private mosquito control including professional spraying, barrier treatments, traps, larvicides, repellents, etc. In the absence of STPMAD, annual household expenditures on private mosquito control were estimated using rates from local mosquito control companies¹⁶, resulting in an estimated cost of \$932.76 per household applied to the 105,082 households within the district. A conservative estimate of 10% of households seeking private mosquito control services was used, based on a study finding that households may hire professional mosquito control services even in areas where a public mosquito control program is already in place.¹⁷ Associated benefits for the avoided cost of private mosquito control total \$40.2 million over a five-year time horizon and \$68.8 million over a ten-year time horizon.

Other Parameters of Cost-Benefit Analysis

In addition to the benefits quantified in the CBA, STPMAD provides qualitative benefits, including potential increases in residential property values resulting from reduced exposure to nuisance and disease-carrying mosquitoes. Accounting for this benefit would further improve the estimated BCR.

Sensitivity Analysis

A key result of a benefit-cost analysis is the benefit-cost ratio or BCR associated that indicates the relative cost-effectiveness of programs. BCR's are sensitive to the cost and benefit values used as inputs to the calculations, as well as the discount rates and time horizons. As described in the earlier sections of the report, all estimates have limitations.

Discount Rate

Sensitivity analyses were conducted at discount rates of 5%, 7%, and 10%. Sensitivity analyses show how changes in key input variables affect the benefit-cost ratio.

Molinari, N. A., Roy, K., Scott, R. D., 2nd, & Petersen, L. R. (2004). West Nile virus economic impact, Louisiana, 2002. *Emerging infectious diseases*, 10(10), 1736–1744. <https://doi.org/10.3201/eid1010.030925>

¹⁶ Arrow Termite & Pest Control. <https://www.arrowtermiteandpestcontrol.com/product/mosquito-control-treatment-initial-fee/>; Bite Back Mosquito Control. <https://bitebackla.com/services/>; The Blood Suckers. <https://www.thebloodsuckers.com/pricing.html>

¹⁷ Richards, S. L., Balanay, J. A. G., Byrd, B. D., Reiskind, M. H., & Styers, D. M. (2017). Regional Survey of Mosquito Control Knowledge and Usage In North Carolina. *Journal of the American Mosquito Control Association*, 33(4), 331–339. <https://doi.org/10.2987/17-6669.1>

Benefit Values

Even when a lower bound value for the willingness to pay for quality of life and outdoor experience due to a decrease in nuisance mosquitoes, assuming the lowest rate of WNF cases, and only 5% of households seeking out private mosquito control, the BCR for STPMAD operations is 2.6. When estimations are assessed using higher bound ranges, which include a higher willingness to pay value for quality of life and outdoor experience and assuming the highest rate of WNF cases, the BCR for STPMAD operations increases to 6.8. Each of the changes in the assumptions for the sensitivity analysis and the resulting BCRs for the 5-year analysis period are described in the following sections.

- **Quality of Life and Outdoor Experience:** For the quality-of-life benefit, households reported an annual willingness to pay (WTP) of \$206.13 for a reduction in nuisance mosquitoes. An alternative value would include an assessment based on quality-of-life improvements from expanded mosquito control that finds a value of \$58.47/person/year.¹⁸ Additionally, a higher-bound value finds \$167.60/person/year for the WTP for one additional hour of recreational activity per week due to a reduction in nuisance mosquitoes from mosquito control.¹⁹ Using the lower bound value generates \$66.9 million in benefits while the higher bound value generates \$191.8 million in benefits when applied to the 2025 total population (279,108) in St. Tammany Parish.
- **Avoided Medical Costs:** To estimate the avoided medical costs associated with WNF and WNND, the CDC-reported low and high ranges of WNF cases associated with each WNND cases were utilized. Using the assumption of 30 WNF cases for every WNND case reported, there is an estimated 382 WNF cases annually, resulting in \$10.4 million in associated benefits. For an upper bound, using the assumption of 70 WNF cases for every WNND case reported, there is an estimated 891 WNF cases, resulting in \$24.3 million in associated benefits.
- **Avoided Cost of Private Mosquito Control:** For the avoided costs associated with private mosquito control for households, a lower bound provided by literature for the percentage of households that would seek out private control were used, with 5% of households (5,254) generating \$20.1 million in benefits.

¹⁸ Dickinson, K. L., Banacos, N., Carbajal, E., Dacko, N., Fredregill, C., Hinojosa, S., Juarez, J. G., Weldon, C., & Hamer, G. L. (2022). Public Acceptance of and Willingness to Pay for Mosquito Control, Texas, USA. *Emerging infectious diseases*, 28(2), 425–428. <https://doi.org/10.3201/eid2802.210501>

¹⁹ Halasa, Y. A., Shepard, D. S., Fonseca, D. M., Farajollahi, A., Healy, S., Gaugler, R., Bartlett-Healy, K., Strickman, D. A., & Clark, G. G. (2014). Quantifying the impact of mosquitoes on quality of life and enjoyment of yard and porch activities in New Jersey. *PloS one*, 9(3), e89221. <https://doi.org/10.1371/journal.pone.0089221>

6. Recommendations

Based on the findings of the performance review of the STPMAD, TBG provides several recommendations for the district and board's consideration in the areas of

- staff retention,
- aircraft management,
- staff and commissioner training opportunities,
- public outreach and education, and
- performance metrics and monitoring.

Each recommendation and its justification based on research findings is described in additional detail below.

Staff Retention

Due to concerns about recent cuts to benefits and salaries in an effort to reduce the overall budget by 8%, the district should consider ways to ensure employee retention is not adversely affected; one approach could be to consider limiting senior staff salary increases to allow for junior level staff pay increases in the future.

Overall, the district has maintained steady staffing levels with low levels of attrition. District staff reported that approximately 57% of staff have been employed by the district for over five years. However, recent concerns have included budget cuts that resulted in reductions to health care benefits for some staff and some pay cuts were made for larvicide and night truck drivers to align with market rates. As the district continues to manage its resources, it may consider temporary reductions in the percentage increases for senior staff salaries to allow for future salary increases of lower level staff to prevent future attrition given recent cuts. In particular, larvicide technicians are likely to experience some level of burnout due to challenging outdoor work conditions, particularly after storms, and the district should develop strategies to ensure retention of these staff into the future.

Vehicles & Aircraft Management

While the district's aircraft and vehicle assets are consistent with other mosquito control districts of comparable size and scope, the district should carefully plan the usage of the helicopter to maximize the value of the investment to taxpayers. The district acquired a helicopter in 2022 to increase efficiency of accessing swamps, woodlands, urban areas, and completing aerial larvicide treatment. The helicopter allows staff to access smaller, more remote points than other vehicles, and by allowing for a more targeted treatment approach, uses less insecticide and therefore lowers input costs. Compared to other districts of similar size and scope reviewed by TBG in Florida, STPMAD's vehicle inventory is consistent with other districts, although slightly more conservative. For example, several districts of comparable

size and scope in Florida (Keys, Lee, Manatee, and Pasco) each have 2 to 4 helicopters compared with STPMAD having only one.

STPMAD reports that the use of the helicopter varies from year to year, depending on treatment needs, and staff carefully weigh the costs and benefits of different treatment techniques. For example, the helicopter requires a \$30,000 inspection at every 100 hours of use, and the hours of usage need to be carefully considered and weighed against the benefits (i.e. cost savings in insecticide use). Additionally, in stakeholder interviews conducted for this review, stakeholders reported the need for multiple types of aircraft to be in district ownership so that during periods of heavy rain and natural disasters the district is not reliant on potentially unavailable aircrafts. Going forward, the district should continue to carefully consider the usage of the helicopter among its fleet of vehicle options and maximize its usage given the investment but also balance it against usage/maintenance costs and per-acre treatment costs.

Staff and Commissioner Training

The district should continue current training efforts for senior leadership and other staff to remain up-to-date on industry standards; the district should consider increasing training opportunities for board members. The district provides numerous opportunities for staff to participate in training and professional development and to ensure that staff receive annual compliance training required for the profession such as state pesticide applicator recertification. In addition, an annual training day takes place at the district for all staff. Individual staff may obtain additional continuing education units depending on their career path, and district staff reported that they are in the process of developing more formalized individual professional development processes. Senior leadership participate in annual trainings such as those provided by the AMCA, to ensure that management is keeping up with national industry standards. The district should consider providing similar training to at least one Commissioner annually to ensure the technical expertise among board members is also current and to provide commissioners insights into the activities and programs of mosquito control districts around the country. AMCA meetings, for example, typically reserve time for concurrent sessions designed specifically for commissioners. The commissioners should be encouraged to attend both state and national meetings when possible.

Public Education and Outreach

The district should continue its education and outreach strategy implementation and identify opportunities to reach members of the public who may still lack complete understanding of district activities and services. The district is viewed very positively by the majority of stakeholders interviewed and surveyed for this review. However, there is a small proportion of survey respondents who indicated negative views of the district's activities, and these views appeared to be supported by a basic misunderstanding of the district's services. The district should continue its extensive public outreach and

engagement strategy and identify any new opportunities to reach residents who may not be fully aware of district activities. For example, posting educational materials in more public places and providing basic educational information in communications with residents and at every service call.

Performance Metrics and Goal Monitoring

As the district continues to implement its recently established performance measures, it should consistently monitor, document, and report performance to enable management and the Board to effectively track progress toward achieving its operational goals. The district has recently outlined very specific and detailed performance metrics and goals in its strategic plan. These goals and metrics are appropriate and consistent with best practices among mosquito control, as shown in the review of 15 Florida mosquito control districts. STPMAD should ensure that it continues to regularly monitor these goals and metrics and update them annually at a minimum.

7. District Response

The STPMAD was provided the option of submitting a formal response letter for inclusion in the final published report. The district's response letter is provided on the following five pages.

MOSQUITO ABATEMENT

ST. TAMMANY PARISH

BOARD OF COMMISSIONERS

Dr. Vicki Traina-Dorge, *Chairperson*
Kathryn Townsend, *Vice-chairperson*
Glen Boyer, *Secretary-Treasurer*
Tod Klotzbach, *Commissioner*
David Billiot, *Commissioner*

ST. TAMMANY PARISH MOSQUITO ABATEMENT DISTRICT Management Response to The Balmoral Group Performance Review

EXECUTIVE DIRECTOR

Dr. Kevin A. Caillouet, *Ph.D., M.S.P.H.*

1 October 2026

The St. Tammany Parish Mosquito Abatement District (STPMAD) appreciates the opportunity to respond to the comprehensive performance review conducted by The Balmoral Group (TBG). We welcome the independent evaluation of the District's operations, service delivery, resource management, performance measures, and cost-benefit of the services provided to the residents of St. Tammany Parish.

The review provides an important independent perspective on the work of STPMAD and confirms what the District has sought to accomplish throughout its history: to provide scientifically based, fiscally responsible mosquito management that protects public health and improves the quality of life of the residents we serve.

Most importantly, STPMAD is pleased that TBG, working in consultation with independent mosquito control subject matter experts, found that the District **follows industry best practices for Integrated Mosquito Management (IMM)** and provides mosquito control services consistent with state law. TBG further found that STPMAD provides comprehensive services consistent with national IMM standards and described the District as an example of effective IMM in the face of significant environmental and demographic challenges. In addition, TBG found that **"consolidation or privatization of operations is not recommended for STPMAD based on the findings of this review."**

Of particular significance to STPMAD management is TBG's assessment of the District's internally developed IMM Plan. TBG characterized the plan as a **"very thorough, well-developed"** document and noted that subject matter experts considered it an **"exemplary mosquito control management guidance document."** STPMAD believes this assessment demonstrates that the District's approach has the potential to serve as a model for other mosquito control districts seeking to develop comprehensive, science-based IMM programs.

The review also reinforces that St. Tammany Parish presents an unusually complex mosquito-management environment. TBG specifically identified the Parish's large geographic area, rapid population growth, frequent heavy rainfall, standing-water conditions, extensive wetlands and, particularly, its extensive network of roadside ditches associated with pollution from onsite sewer disposal systems. TBG noted that the combination and severity of these conditions is different from what many other mosquito control districts encounter.

These circumstances are important when evaluating the cost of mosquito management in St. Tammany Parish. The presence of more than 600 miles of roadside septic ditches and a high prevalence of malfunctioning or failing onsite sewage disposal systems creates mosquito-producing habitat that is unusual and outside the norm for many mosquito control programs. STPMAD must therefore devote significant resources to surveillance, source reduction, larval control, and adult mosquito control in habitats that are directly influenced by these conditions.

At the same time, TBG's cost-benefit analysis provides compelling evidence of the value returned to St. Tammany Parish taxpayers. Using its primary assumptions, TBG calculated approximately **\$149.9 million in benefits against \$38.2 million in costs over five years, producing a benefit-cost ratio of \$3.92 in benefits for every \$1 invested in STPMAD services.** TBG's sensitivity analysis further demonstrated that the estimated benefit-cost ratio remained positive under more conservative assumptions, with a low-end ratio of 2.6 and a high-end ratio of 6.8.

For STPMAD management, these findings validate the fundamental value of maintaining a locally controlled, science-based mosquito management program while continuing to look for opportunities to improve efficiency and maximize the value of every taxpayer dollar.

Management Response to TBG Recommendations

STPMAD management appreciates TBG's five recommendations and views them as opportunities to strengthen an already effective program. Management's planned responses are as follows:

1. Aircraft Management and Maximizing the Value of the Helicopter

STPMAD agrees with TBG that the District should continually evaluate how its aircraft assets can provide the greatest value to taxpayers. Importantly, TBG found that STPMAD's aircraft and vehicle inventory is consistent with mosquito control districts of comparable size and scope and recognized that the helicopter provides capabilities that other vehicles cannot, including access to smaller, remote, wooded, swamp, and urban locations and the ability to conduct more targeted treatments using less insecticide.

STPMAD management will therefore continue evaluating additional uses for its Bell 407 helicopter, with particular emphasis on expanding its role in targeted aerial adulticide missions. More targeted helicopter applications may allow the District to address mosquito populations in specific areas while reducing reliance on large treatment-area blocks using the District's fixed-wing Twin Otter aircraft.

Management also intends to evaluate opportunities to expand the helicopter's use for aerial larvicide operations, particularly in habitat where the helicopter's maneuverability and access provide an operational advantage over ground-based equipment.

In addition, STPMAD management is currently engaged in discussions regarding opportunities to provide aerial mosquito control services to other Louisiana parishes. Such arrangements have the potential to make greater productive use of District aviation assets while aiding

neighboring mosquito control programs when appropriate and operationally feasible. STPMAD already maintains cooperative relationships with other Louisiana mosquito control districts, including an aerial aircraft-sharing arrangement with Tangipahoa Parish.

The District will continue to balance aircraft utilization against maintenance, operating, treatment, and readiness costs, consistent with TBG's recommendation.

2. Employee Retention and Compensation

STPMAD recognizes that retaining experienced and highly trained personnel is essential to maintaining the quality of the District's mosquito management program. TBG noted that the District has maintained relatively steady staffing and low attrition, while also identifying employee compensation and retention as areas management should continue to monitor.

To address this recommendation while maintaining fiscal discipline, STPMAD management plans to cap cost-of-living wage increases for the District's top 30 percent of wage earners. This approach is intended to provide greater flexibility to direct available compensation resources toward lower-paid positions and help address recruitment and retention challenges among employees performing critical field and operational functions.

Management believes this approach provides a reasonable balance between fiscal responsibility, employee retention, internal equity, and the need to maintain a highly skilled workforce.

3. Training, Professional Development, and IMM Certification

STPMAD agrees with TBG's recommendation that the District continue investing in training and professional development. TBG recognized that STPMAD already provides numerous training opportunities, annual compliance training, pesticide applicator recertification, an annual District-wide training day, continuing education opportunities, and professional development for senior leadership.

STPMAD plans to continue and expand opportunities for staff training so that employees remain current with evolving mosquito control practices, technologies, public health guidance, and industry standards.

STPMAD management will also continue to advocate for the development of a formal Integrated Mosquito Management certification program within the mosquito control profession. At present, a broadly recognized formal IMM certification program for mosquito control professionals does not exist. Likewise, opportunities for individual STPMAD employees to pursue a recognized professional IMM certification do not currently exist in the manner envisioned by TBG's recommendation.

The District believes that the absence of such a certification program represents an opportunity for the industry as a whole. STPMAD intends to continue advocating for the creation of meaningful IMM professional standards and certification opportunities and believes that its own IMM program and staff expertise position the District to contribute to such an effort.

STPMAD will also continue to support opportunities for Board members to gain additional understanding of mosquito control operations and industry practices, consistent with TBG's recommendation.

4. Public Education and Outreach

STPMAD appreciates TBG's recognition of the District's extensive outreach and education efforts. TBG found that the District is viewed positively by most stakeholders and recognized its extensive outreach through schools, community organizations, presentations, publications, social media, its website, resident interactions, and other community activities.

STPMAD intends to continue its high-quality public education and outreach program. At the same time, management recognizes that traditional outreach methods do not necessarily reach every segment of the population.

Accordingly, STPMAD will reassess how it can reach residents who may not ordinarily encounter the District through community events, social media, presentations, or other existing outreach channels. One potential strategy will be the use of direct mailers or other targeted communications to residents that provide basic information about STPMAD's mission, services, mosquito surveillance, disease prevention, service requests, and the value provided by the District.

The goal is not simply to increase the amount of information distributed, but to ensure that information reaches residents who may have limited awareness or understanding of what STPMAD does and why the District's services are necessary.

5. Performance Metrics and Goal Monitoring

STPMAD agrees with TBG that the District's recently established performance measures should be consistently monitored, documented, and reported. TBG found that the District's performance metrics and goals are specific, detailed, appropriate, and consistent with best practices identified in its review of other mosquito control districts.

To further improve transparency and accountability, STPMAD management plans to develop digital performance dashboards that will automatically report progress toward the District's established core performance metrics.

These dashboards will provide management with an ongoing view of operational performance and will allow the District to more readily identify trends, evaluate progress, and respond when performance indicators suggest that adjustments are warranted.

In addition, STPMAD plans to present performance metric grades in its quarterly newsletters and provide a summary of performance at least annually during a STPMAD Board of Commissioners meeting. This approach will provide management, the Board, employees, taxpayers, and the public with a clearer and more accessible understanding of how the District is performing against its established goals.

Conclusion

St. Tammany Parish Mosquito Abatement is grateful for the opportunity to have its operations independently examined by The Balmoral Group. An independent review of this scope provides an important level of accountability to the residents and taxpayers of St. Tammany Parish.

The review confirms that STPMAD is operating in accordance with recognized industry best practices and that its comprehensive IMM approach is effective, innovative, and responsive to the unique challenges of St. Tammany Parish. TBG's characterization of the District's IMM Plan as exemplary is particularly significant and reinforces STPMAD's belief that the District's approach can serve as a model for mosquito control programs beyond St. Tammany Parish.

Just as importantly, the cost-benefit analysis demonstrates that the District provides substantial value to the community. A return of \$3.92 in quantified benefits for every \$1 invested demonstrates that mosquito abatement is not simply an expenditure; it is an investment in public health, quality of life, outdoor recreation, and the economic well-being of St. Tammany Parish.

STPMAD management accepts the spirit of all five recommendations and is committed to using them to make a strong program even better. The District will continue to evaluate its resources, invest in its employees, improve its use of technology and aircraft, expand its public outreach, and strengthen its measurement and reporting of performance.

Our obligation is straightforward: **to provide the highest quality mosquito management possible while being responsible stewards of the taxpayers' resources entrusted to us.** The Balmoral Group's independent review provides strong evidence that STPMAD is meeting that obligation—and provides a roadmap for continuing to improve it.

Respectfully submitted,



Dr. Kevin Caillouet

Executive Director

St. Tammany Parish Mosquito Abatement District

Appendix A: Project Team

TBG's team has significant experience evaluating public programs, including assessments of agency data systems; cost-benefit analyses; regulatory cost estimations; statutory performance reviews; operational effectiveness studies; and governance evaluations for government agencies and special districts. Recent work includes the legislatively mandated performance reviews of 15 Independent Mosquito Control Districts in Florida and the business case evaluation for the Florida Department of Management Services SUNCOM telecommunications system, both of which required multi-method data collection, comparative benchmarking, stakeholder engagement, and detailed reporting to decision-makers. TBG staff also have extensive experience working with legislative directives and statutory provisions, including meeting statutory timelines, working with location-specific demographic and socio-economic data, and developing statutory and programmatic recommendations which have been implemented.

Laila Racevskis, Ph.D., Project Manager has 19 years of experience and is an expert policy and economic analyst, project manager, and facilitator. Laila previously served in Senior and Chief Legislative Analyst positions in the Government Operations unit for the Florida Legislature's Office of Program Policy Analysis and Government Accountability (OPPAGA) from 2013 to 2019. She served as Staff Director of OPPAGA's Health and Human Services unit from 2019 to 2023. During this time, she gained extensive experience with program evaluation and policy analysis related to numerous programs across multiple levels of government in Florida. Before her experience with the Florida Legislature, she served several years as Director of the University of Florida's Natural Resources Leadership Institute, training individuals in the public and private sectors on facilitation, consensus-building, and collaboration. Laila is an effective and reliable Project Manager with The Balmoral Group. She managed the performance reviews of fifteen Mosquito Control Districts for OPPAGA in 2023 as directed by s. 189.0695, Florida Statutes. In addition, the Orange County Wetland Permit Fee study that evaluates permitting processes, labor requirements, and county permit fee schedules. She is also the Project Manager for a three-year project for the Florida Department of Environmental Protection and the Apalachicola National Estuarine Research Reserve that focuses on improving landscape-scale stakeholder collaboration for ecological restoration activities in the Apalachicola Watershed through the development of stakeholder engagement and communication processes. Finally, she led a Statement of Estimated Regulatory Cost (SERC) for a Vegetation and Debris Management Rule for the South Florida Water Management District which assisted the District in accounting for all potential costs associated with the canal's vegetation and debris management rule. Dr. Racevskis brings a wealth of experience related to government programs in Florida, as well as a strong background in program evaluation, policy, and economic analysis.

Cortney Cortez, M.A., Deputy Project Manager, Senior Economist is a skilled economist with 11 years of experience including economic modeling, cost-benefit analysis, data collection, programmatic review,

and survey design. She is also seasoned professional in stakeholder outreach and has conducted hundreds of interviews during her time with The Balmoral Group. She served as a Researcher for the OPPAGA Mosquito Control District Evaluations and as a Research Economist for the New South Wales EPA's Waste Less Recycle More review. She has managed projects ranging from fiscal and economic impact assessment for the Florida Inland Navigation District, valuation of programmatic benefits for the Charlotte Harbor National Estuary Program (CHNEP), a 6,877 square mile area, and evaluation of Florida's statewide energy equity metrics.

Valerie Seidel, Principal in Charge is an accomplished professional with over 30 years of experience. She brings significant expertise in cost-benefit analysis, public policy analysis, public resource allocation, strategic planning, and stakeholder engagement. Ms. Seidel brings deep expertise in project management, management strategy, program research & evaluation, and advisory assistance which she brought for many initiatives including OPPAGA, Mosquito Control District Evaluations, FDEP Water Resource Monitoring Council, SWFWMD Cost-Share Initiative Review, FDACS Energy Equity Study and the FDEO Coastal Resiliency Strategy Alternatives. She is a resourceful and open-minded practitioner that maintains an awareness of emerging models, techniques and technical skills through frequent participation in technical conferences and educational seminars. In addition to economic work, Ms. Seidel served ten years as a federal regulator and conducted inventories of fleets and equipment at more than 180 financial institutions, in accordance with federal documentation requirements. Her responsibilities included preparing and presenting cost estimates and whitepapers to support decisions pertaining to initiation, settlement, or strategic changes in litigation and bankruptcy matters; establishing capital and operating expenditures budgets for real estate and subsidiary assets acquired by FDIC; asset valuation efforts, and drafting SOPs (Standard Operating Procedures) for complex situations. She worked closely with expert witnesses in a variety of disciplines and understands the importance of processes and documentation that withstand scrutiny. Our team will be supported by Subject Matter Experts, Dennis Moore, M.S., and Doug Carlson, B.A.

Dennis Moore, M.S., Subject Matter Expert, is an entomologist and previous Director of the Pasco Co. Mosquito Control District for 17 years. Currently, he is the Editor-in-Chief of Wing Beats magazine, a trade magazine for mosquito control designed to keep all interested parties informed on matters as they relate to mosquito and vector control and to disseminate information to help educate and raise the level of the mosquito control profession both nationwide and internationally.

Doug Carlson, B.A., Subject Matter Expert, is a mosquito expert who worked for the Indian River Mosquito Control District (IRMCD) for 42 years in his most recent position as Director. Doug has authored approx. 60 professional articles (over half of them in peer-reviewed journals and served as co-editor of the 3 editions of the Florida White Paper on Mosquito Control (1998, 2009, 2018).

Alicia Barker, Data Manager, Senior Economist has 13 years of experience as an efficient and highly effective database manager. Her skills include data collection, independent research, community and stakeholder engagement, statistical modeling, quality control, geospatial and sensitivity analysis. Alicia has played key roles in extracting and modeling relevant property, demographic and socio-economic data and analyzing such data within GIS. She has experience working on government programs; she served as the Deputy Project Manager for the OPPAGA Mosquito Control District Evaluations and for the Florida Department of Transportation (FDOT) and Virginia Department of Transportation (VDOT)'s Strategic Resources Evaluation Study (SRES). She worked with the advisory teams (all five water management districts, and multiple technical advisory groups) for a FL Department of Agriculture and Consumer Services project to develop a statewide agricultural database in ArcGIS. Additionally, she led technical duties in the FL Price Level Index work for the FL House of Representatives. Alicia understands time constraints and attention to detail.

Campbell Cole, B.S., Economic Analyst is a skilled social scientist with expertise in policy analysis, research, and in conducting interviews to support client reports. He has 4 years of experience and is an apt interviewer and analyst of fiscal implications, funding streams, and policy impacts. His noteworthy contributions include his work on the OPPAGA Mosquito Control District Evaluations, which involved extensive fieldwork and coordination throughout Florida to produce a detailed report for the Florida Legislature. In his role, he undertook comprehensive outreach to district staff. Campbell brings valuable experience from his roles as a Research Analyst for the Indian River Lagoon Comprehensive Management Plan Support, where he collected data on public grants and other funding streams to prepare 20-year projections of alternative funding scenarios.

Evan Graetz, M.S., Economic Analyst plays a vital role in TBG projects, providing critical support in research, data analysis, technical writing, and application of analytical methods. He supported OPPAGA's Mosquito Control District Evaluations, FDEP's Apalachicola Regional Restoration Coordination project, Orange County Environmental Protection Division's Green Places Economic Evaluation, and many others.

Madison Drewry, B.S., Economic Analyst supports projects involving economic research, data analysis, and policy evaluation. She has contributed to a range of projects spanning sustainability reporting, climate resilience, and agricultural policy analysis. Her experience includes working with GIS and Python for spatial analysis, assisting with cost-benefit analysis and socio-economic research, and reviewing scientific literature to inform environmental restoration efforts.