NORTHWEST MOSQUITO ABATEMENT DISTRICT

Keeping the community safe

Decennial Committee Report 2024

Permanent Location:

147 W. Hintz Road

Wheeling, Illinois 60090

www.nwmadil.com

847.537.2306

Temporary Location:

1500 Hicks Road, Suite 100

Rolling Meadows, Illinois 60008

www.nwmadil.com

847.537.2306

NORTHWEST MOSQUITO ABATEMENT DISTRICT REPORT FOR COMPLIANCE WITH DECENNIAL COMMITTEES ON LOCAL GOVERNMENT EFFICIENCY ACT

I. UNIT OF GOVERNMENT SUBMITTING THIS REPORT:

Northwest Mosquito Abatement District ("**NWMAD**")
147 W. Hintz Road
Wheeling, Illinois 60090

Temporary Location: 1500 Hicks Road, Suite 100, Rolling Meadows, Illinois 60008

Seasonal Locations: 70 Scott Street, Elk Grove Village, Illinois 60007
12n400N Bartlett Road, Hanover Township, Illinois 60120

II. GENERAL INFORMATION AND MISSION OF THE NWMAD:

Mission Statement:

- Manage mosquito populations that inhibit residents from enjoying the outdoors and/or mosquitoes that can carry and transmit diseases to humans.
- Use integrated pest management (best management practices) to manage mosquito populations, which includes adult and larvae mosquito surveillance, larval abatement, adult treatment, mosquito habitat source reduction and public education.

- Located in the Northwest suburbs of Cook County. There are 29 villages served by the District. Coverage includes 242 square miles.
- Serves approximately 800,000 residents, as of the 2020 census.
- Currently employs 13 full-time employees (not including appointed trustees).
- Additionally employs 40-60 seasonal employees (not including appointed trustees).
- Annual budget for FY2024 is $3,771,662.31.
- The equalized assessed valuation for Cook County FY2023 is $32,398,941,687.00.
- The District's final agency tax rate for FY2023 was 0.0092.
- The District conducts over 70,000 treatments for mosquitoes per year.

III. INFORMATION ABOUT THE DECENNIAL COMMITTEE:

a. Committee Members:

- James P. Thennisch, Director of the NWMAD and Chair of the Decennial Committee
- Daniel Ansani, Trustee Member
- Dale Niewiardowski, Trustee Member
- Russell Nowak, Trustee Member
- Lenn Grant, Resident Member

- Christopher Kottra, Resident Member
- Dr. Patrick Irwin, Ph.D. (Entomologist), Consultant

b. Committee Meeting Dates:

- May 17, 2023 – Formation of 2024 Decennial Committee
- July 19, 2023 – First Decennial Committee meeting
- November 15, 2023 – Second Decennial Committee meeting
- April 3, 2024 – Third Decennial Committee meeting

IV. DECENNIAL COMMITTEES ON LOCAL GOVERNMENT EFFICIENCY ACT:

Public Act 102-1088 enacted on June 10, 2022 created the *Decennial Committees on Local Government Efficiency Act* requiring units of local government to form a committee to study the following:

- Unit of local government's governing statutes
- Ordinances
- Rules
- Procedures
- Powers
- Jurisdiction
- Shared services
- Intergovernmental agreements
- Interrelationships with other units of local government and the State
- Any other issues pertinent to the unit of local government

The committee shall be formed one year after the effective date of this Public Act, and at least once every 10 years thereafter. The committee's membership shall include the appointed members of the governing board of the governmental unit, any chief executive officer or other officer of the governmental unit, and at least 2 residents of the governmental unit who are appointed by the chair of the board of the governmental unit. The committee shall meet at least 3 times.

Committee members shall serve without compensation but may be reimbursed by the governmental unit for their expenses incurred in performing their duties. The governmental unit shall provide administrative and other support to its committee. The committee shall meet in accordance with the Open Meetings Act, and the committee shall be a public body to which the Freedom of Information Act applies. Meetings may be held in conjunction with regularly scheduled meetings of the governmental unit as an agenda item, subject to conformance with the Open Meetings Act and a majority of committee members present.

The committee shall collect data, research, analysis, and public input in their study. The committee shall create a report with recommendations regarding increased accountability and efficiency to be submitted to the county board in which the unit of local government is located no later than 18 months after the formation of the committee. The report shall be made available to the public. After the committee has issued its report, the committee is dissolved.

V. DISTRICT'S OPERATIONAL SUMMARY & REPORTS:

Annual Reports 2023	The District produces an annual Mosquito Abatement District report which is sent to Illinois Department of Public Health (as required by 70 ILCS 1005/et.seq.). This report details the operational activities of NWMAD, products used to manage larval and adult mosquitoes, and surveillance data. The District also files an annual General Permit for Pesticide Application Point Source Discharge report as part of our National Pollutant Discharge Elimination System permit.
Audit Report 2024	The District's finances are audited each year by an independent auditing firm and are in good standing with sufficient reserves. The resulting report is available to residents and submitted to the State of Illinois Comptroller.

VI. ILLINOIS GOVERNING STATUTES:

Illinois Governing Statutes	Description of Statute
Mosquito Abatement District Act – 70 ILCS 1005	Created mosquito abatement districts in Illinois and details the purpose and mandate of the District. Outlines powers delegated to the District.
Illinois Pesticide Act – 415 ILCS 60	Regulates District Operations; Issues the licenses for the District and employees along with the Illinois Department of Agriculture.
Environmental Protection Act – 415 ILCS 5	Allows the District to collect and recycle waste tires.

VII. ORDINANCES

District Ordinance Category	Description of Ordinance Category
Board Meeting Policy	Ordinances needed to update and to comply with new requirements of the Open Meetings Act; public comment, remote meeting attendance, review of closed session minutes.
Employee Policy	Ordinances adopting prevailing wage standards, travel expense reimbursements, policies prohibiting sexual harassment, whistleblower protection & prevention policy, smoke free property policy.

VIII. RULES:

District Employee Guidelines	Description of Document
Employee Personnel Handbooks	Full Time & Seasonal Employee Handbooks
NWMAD Organizational Chart	Last updated in April 2024
Employee Position Descriptions	Full Time & Seasonal Position Descriptions

IX. PROCEDURES AND MANAGEMENT PRACTICES:

Procedures and Management Practices	Description of Document
NWMAD Schedule of Compliance	Calendar of all the instances during the year that the District is required to comply with either county, state or federal regulations.
Best Practices of Integrated Mosquito Control	Written by the American Mosquito Control Association to advise Mosquito Abatement District programs.
NWMAD Integrated Pest Management Plan	Derived from the *Best Practices of Integrated Mosquito Contro*l from the American Mosquito Control Association. This plan governs our treatment activities and the decision-making thresholds that the District uses.
FY 2024 Annual Financial Report	Compiled from the results of the District's yearly audit. It is also available to residents and submitted to the State of Illinois Comptroller.

X. DISTRICT POWERS:

Described in ILCS 70/1005 Section 7:

Sec. 7. The board of trustees of such district shall have power to take all necessary or proper steps for the extermination of mosquitoes, flies or other insects within the district, and, subject to the paramount control of the municipal or other public authorities, to abate as nuisances all stagnant pools of water and other breeding places for mosquitoes, flies or other insects within the district; to purchase such supplies and materials and to employ such labor and assistants as may be necessary or proper in furtherance of the objects of this Act, and if necessary or proper, in the furtherance of the same, to build, construct and thereafter to repair and maintain necessary levees, cuts, canals or channels upon any land within the district, and to acquire by purchase, condemnation or other lawful means, in the name of the district, any necessary lands, rights of way, easements, property or material requisite or necessary for any such purpose; to make contracts to indemnify or compensate any

owner of land or other property for any injury or damage necessarily caused by the exercise of the powers of this Act conferred or arising out of the use, taking or damage of such property for any such purposes, and generally to do any and all things necessary or incident to the powers hereby granted and to carry out the objects specified herein.

XI. JURISDICTION:

District Boundaries - See maps attached hereto as Exhibit A.

- The District serves approximately 800,000 residents in the townships of Barrington, Palatine, Wheeling, Hanover, Schaumburg, Elk Grove Village, Maine, one (1) square mile of Norwood Park and six (6) square miles of Northfield.
- The area covered by the NWMAD consists of approximately 242 square miles of Cook County's Northwest suburbs. The District has over 10,000 cataloged above ground aquatic sites and ditches which may produce mosquito larvae and over 70,000 stormwater catch basins which are great habitats for the mosquitoes which are capable of transmitting West Nile virus. There are more than 3,200 miles of roadways in the District.

XII. INTERGOVERNMENTAL AGREEMENTS:

NWMAD has intergovernmental agreements with all Villages in our District and MGP to share GIS data concerning storm water sewer infrastructure mapping.

XIII. INTERRELATIONSHIPS:

a. Interrelationships with other units of Local Government

Villages in our district	Departments	Interaction
Arlington Heights	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Barrington	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Barrington Hills	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards

Bartlett	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Buffalo Grove	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Des Plaines	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Elgin	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Elk Grove	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Glenview	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Hanover Park	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Hoffman Estates	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Inverness	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards

Mount Prospect	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Niles	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Northbrook	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Palatine	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Park Ridge	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Prospect Heights	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Rolling Meadows	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Schaumburg	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
South Barrington	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards

Streamwood	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards
Wheeling	Communications, Environmental Health, Public Works, Village Manager, Park District	Weekly Mosquito reports, alerts for adult mosquito control, general mosquito inquiries, presentations to village boards

b. Interrelationships with Regional Agencies

Cook County	Public Health and Forest Preserve District	Weekly mosquito reports, West Nile virus testing results, Data sharing
City of Chicago	Public Health	Weekly mosquito reports,
Northshore	Mosquito Abatement District	Applied research projects, Weekly mosquito report, Data sharing
Des Plaines Valley	Mosquito Abatement District	Applied research projects, Weekly mosquito report, Data sharing
South Cook County	Mosquito Abatement District	Applied research projects, Weekly mosquito report, Data sharing
Macon County	Mosquito Abatement District	Applied research projects, Weekly mosquito report, Data sharing
Wheaton	Mosquito Abatement District	Applied research projects, Weekly mosquito report, Data sharing

c. Interrelationships with State Government Agencies

State of Illinois	Public Health	Weekly mosquito reports, West Nile virus testing results, annual report
State of Illinois	EPA	NPDES permit, annual report, Pesticide discharge management plan

State of Illinois	DNR	Consult about threatened and endangered species in our district
State of Illinois	Agriculture	Pesticide licensure for district employees, beehive list in our district
State of Indiana	Public Health	Data sharing
State of Wisconsin	Public Health	Data sharing

d. Interrelationships with Federal Government

Centers for Disease Control		Data sharing, consultation
US Fish and Wildlife		Endangered Species Letters of Technical Assistance
United States Department of Agriculture - Agriculture Research Service	Dept. Mosquito and Fly Research	Data and sample sharing, applied research

e. Interrelationships with Universities

University of Wisconsin-Madison, WI	Pathobiological Sciences, Entomology, Population Health Sciences, Bacteriology	Data sharing, applied research projects
University of New Mexico - Albuquerque, NM	Global Health	Data sharing, applied research project
University of Florida - Gainesville, FL	Entomology and Nematology	Data sharing, applied research projects
University of Maryland - College Park, MD	Entomology	Data sharing, research projects

Columbia University - New York, NY	Public Health	Data sharing, applied research project
Loyola University - Chicago, IL	Public Health	Data sharing, applied research projects
Harper College - Palatine, IL	Biology and GIS	Consult on a federal grant for GIS/Biology integration, Applied Research, Data sharing
Minnesota State University - Mankato and St. Paul, MN	Dept. Engineering	Applied engineering and mosquito research

f. Interrelationships with Federally sponsored consortium

Midwest Center of Excellence for Vector-Borne Diseases	CDC funded consortium of Midwest academic institutions, state public health, industry, and mosquito abatement districts	Data sharing, applied research, training, outreach

g. Interrelationships with other organizations

Illinois Mosquito and Vector Control Association	Sustaining member, Annual meetings, Presentations, Past President is a staff member of the district
American Mosquito Control Association	Sustaining member, Annual meeting, presentations, current staff member is on publications committee

XIV. PROGRAMS OFFERED BY THE NORTHWEST MOSQUITO ABATEMENT DISTRICT:

The NWMAD uses an Integrated Mosquito Management ("IMM") approach to controlling mosquito populations and reducing the risk of mosquito-borne diseases.

Key Components to IMM:

1. Surveillance: Monitoring mosquito populations and disease activity to guide control efforts. NWMAD monitors over 10,000 above ground water sources and 80,000 stormwater catch basins for mosquito larvae. These sites are mapped and cataloged using GIS software which allows the District to see what sites have been inspected and/or treated in real time. The

District also has a network of 31 adult mosquito traps throughout the district which is monitored 5 times a week, May-October to determine population fluctuations in both nuisance mosquitoes (biting, but non-disease transmitting), vector mosquitoes (capable of transmitting diseases, primarily West Nile virus (WNv)), and invasive species of mosquitoes. Species capable of transmitting WNv are tested in the lab to determine how much virus is circulating in these mosquitoes. From this population data and rates of WNv infected mosquitoes the District can determine the risk of human acquired case for each trap using the "Vector Index" (VI). The District knows, statistically, that once the VI approaches 1.0 or higher, it needs to conduct adult mosquito control around the trap in question.

2. Source Reduction: Eliminating or managing mosquito breeding sites, such as standing water. With every interaction the District has with the residents it reminds them to check their own yards for containers which can hold water for more than 5 days. The District did an outreach campaign to district automotive garages encouraging them to get rid of used tire stocks and to cover them, so they do not become breeding grounds for WNv vector mosquitoes.

3. Control of Mosquito Life Stages. Using methods like larviciding (targeting larvae) and adulticiding (targeting adult mosquitoes) to reduce populations. NWMAD only treats water sources if they have demonstrable mosquito larvae. The District uses both Insect growth regulators which prevent larvae from becoming adults. In some case it may use a bacterium -derived larvicide. Both products are applied at the label rate for the specific aquatic site area. Adulticide is applied via truck mounted Ultra-Low Volume (ULV) machines which are calibrated every year to ensure the District is applying the correct amount of product. NWMAD only uses adulticides which leave no residual – meaning that they are broken down by sunlight, soil or microbes rapidly. The District only sprays at night when mosquitoes are active and beneficial insects, such as pollinators are not active. By the time beneficial insects come out in the morning the product has broken down into non-toxic components.

4. Insecticide Resistance Testing. Ensuring that mosquitoes are not becoming resistant to the insecticides being used. NWMAD tests wild-caught adult mosquitoes and have tested them using the World Health Organization (WHO) and CDC approved bottle bioassay to ensure the mosquitoes are not developing resistance to the adulticide. The District has also conducted topical applications (a more refined method for determining resistance to adulticides). The District has also conducted caged field trials where it puts adulticide susceptible and wild caught unknown susceptible mosquitoes in cages at various intervals from the ULV mounted trucks sprayers to determine if there is survival in our wild caught species. NWMAD also does bioassays to ensure the larvicides being used are effective at killing larval mosquitoes. This is done in lab assays, semi field barrel assays and conduct "back checks" in both aquatic sites and stormwater catch basins.

5. Public Education. Informing the community about how to reduce mosquito habitats and protect themselves from bites. NWMAD takes every opportunity it can to educate the public about mosquitoes, the diseases they can carry, how to avoid bites, and how the District operates to control mosquitoes and the diseases they can carry. NWMAD communicates this information through its website www.nwmadil.com (www.nwmadil.gov is currently being developed) and through information booths at Earth Day celebrations, health fairs, and farmer's markets throughout the different municipalities in the district. The District also conducts informational presentations to government officials, civics groups, and neighborhood associations. Finally, the District engages with local media requests to get its

message out about increased WNv activity, avoiding mosquito bites, mosquito control operations etc.

6. Vehicles and Equipment. As of the latest fiscal year the District maintains the following list of vehicles and equipment:

Vehicles = 50 total

1 – 2005 Chevrolet Silverado
1 – 2006 Chevrolet Silverado
3 – 2007 Chevrolet Silverado
2 – 2008 Chevrolet Silverado
3 – 2009 Chevrolet Silverado
3 – 2010 Chevrolet Silverado
1- 2011 Chevrolet Silverado
3 – 2012 Chevrolet Silverado
3 – 2013 Chevrolet Silverado
5 – 2015 Chevrolet Silverado
3 – 2016 Chevrolet Silverado
3 – 2017 Chevrolet Silverado
4 – 2018 Chevrolet Silverado
5 – 2020 Chevrolet Silverado
3 – 2021 Chevrolet Silverado
4 – 2022 Chevrolet Silverado
3 – 2024 Chevrolet Silverado

Application Equipment

62 London Fog 18-20 ultra-low volume sprayers
72 Maruyama backpack sprayers/mister/duster

Trap Equipment

3 BG sentinel traps
45 CDC gravid traps
3 EVS traps
14 New Jersey Light traps
10 handheld aspirators
1 backpack aspirator
15 CDC Light/CO2 traps
4 BG counters

XV. AWARDS, RECOGNITIONS, COLLABORATIONS AND PUBLICATIONS:

1. Lopez, K., Harbison, J., **Irwin, P**., Erkapic, A., Holub, R., Blanco, C., Paskewitz, S., Clifton, M. and Bartholomay, L., 2024. Extreme resistance to S-methoprene in field-collected *Culex pipiens* (Diptera: Culicidae) across the Chicago, IL region. *Scientific Reports*, 14(1), p.18001.
2. Chakravarti, A., Li, B., Bartlett, D., **Irwin, P**. and Smith, R., 2024. Where to place a mosquito trap for West Nile Virus surveillance? *arXiv preprint arXiv:2406.06920*.
3. **Irwin, P**. and Harbison, J.E., 2024. Year-round Observations of Adult *Culex* Mosquitoes in Storm Sewer Pipes in the Northwestern Chicago Suburbs. *Journal of the American Mosquito Control Association*.

4. Lopez, K., **Irwin, P**., Bron, G.M., Paskewitz, S. and Bartholomay, L., 2023. Ultra-low volume (ULV) adulticide treatment impacts age structure of *Culex* species (Diptera: Culicidae) in a West Nile virus hotspot. *Journal of Medical Entomology*, 60(5), pp.1108-1116.
5. Uelmen, J.A., Lamcyzk, B., **Irwin, P**., Bartlett, D., Stone, C., Mackay, A., Arsenault-Benoit, A., Ryan, S.J., Mutebi, J.P., Hamer, G.L. and Fritz, M., 2023. Human biting mosquitoes and implications for West Nile virus transmission. *Parasites & Vectors*, 16(1), pp.1-16.
6. **Irwin, P**. and Bartlett, D., 2023. Beyond tip it and toss it for *Culex* larvae control. *Wingbeats* (invited submission), 34(2), pp.30-32.
7. Burgess, E.R. IV, Lopez, K., **Irwin, P**., Jaeger, C.P. and Estep, A.S., 2022. Assessing pyrethroid resistance status in the *Culex pipiens* complex (Diptera: Culicidae) from the northwest suburbs of Chicago, Illinois using Cox regression of bottle bioassays and other detection tools. *PLoS ONE*, 17(6), e0268205.
8. Susong, M., Tucker, B.J., Bron, G.M., **Irwin, P**., Kirsch, J.M., Vimont, D., Stone, C., Paskewitz, S.M. and Bartholomay, L.C., 2022. Snow-Covered Tires Generate Microhabitats That Enhance Overwintering Survival of *Aedes albopictus* (Diptera: Culicidae) in the Midwest, USA. *Environmental Entomology*, nvac023.
9. **Irwin, P**., Bartlett, D. and Lopez, K., 2022. Spatial Analysis of the Impact of "Do Not Spray" Areas on Mosquito Adulticiding in the Suburbs of Northwest Chicago, Illinois. *Journal of Environmental Health*, 84(9), pp.22-28.
10. **Irwin, P**., Lopez, K. and Harbison, J.E., 2022. Reduced Potential for Consecutive Truck-Mounted Ultra-Low Volume Mosquito Adulticide Applications in Chicago Metropolitan Area Due to Weather Conditions. *Journal of the American Mosquito Control Association*, 38(1), pp.74-76.
11. American Mosquito Control Association (AMCA), 2021. Best Practices for Integrated Mosquito Management. Sacramento, CA, USA: AMCA. (**Irwin, P**. Steering committee member, author of Habitat Modification and Biocontrol section).
12. Keyel, A.C., Gorris, M.E., Rochlin, I., Uelmen, J.A., Chaves, L.F., Hamer, G.L., **Irwin, P.M.** and Smith, R.L., 2021. A proposed framework for the development and qualitative evaluation of West Nile virus models and their application to local public health decision-making. *PLOS Neglected Tropical Diseases*, 15(9), e0009653.
13. Harbison, J.E., **Irwin, P.M.** and Clifton, M.E., 2021. Operational Basin Larvicide Evaluations in Northern Cook County, Illinois During 2019 and 2020. *Journal of the American Mosquito Control Association*, 37(3), pp.179-181.
14. Uelmen, J.A., **Irwin, P.M**., Brown, W.M., Karki, S., Ruiz, M.O., Li, B. and Smith, R.L., 2021. Dynamics of data availability in disease modeling: An example evaluating the trade-offs of ultra-fine-scale factors applied to human West Nile virus disease models in the Chicago area, USA. *PloS ONE*, 16(5), p.e0251517.
15. Uelmen, J.A., **Irwin, P.M**., Bartlett, D., Brown, W., Karki, S., Ruiz, M.O.H., Fraterrigo, J., Li, B. and Smith, R.L., 2020. Effects of Scale on Modeling West Nile Virus Disease Risk. *The American Journal of Tropical Medicine and Hygiene*, 104(1), pp.151-165.
16. Paskewitz, S., **Irwin, P.M**., Konwinski, N. and Larson, S., 2018. Impact of Consumption of Bananas on Attraction of Anopheles stephensi to Humans. *Insects*, 9(4), p.129.
17. Harbison, J.E., Nasci, R., Runde, A., Henry, M., Binnal, J., Hulsebosch, B., Johnson, H., Bradley, M., Newton, G., **Irwin, P.M.** and O'Hara Ruiz, M., 2018. Quality control evaluations of catch basin larvicides from seven mosquito control programs in the Midwest United States during 2017. *Journal of the American Mosquito Control Association*, 34(2), pp.107-116.
18. DeFelice, N.B., Schneider, Z., Kandula, S., Barker, C., Campbell, S.R., Damian, D., **Irwin, P.M.**, Jones, H., Townsend, J. and Shaman, J., 2017. Use of temperature to improve West Nile virus forecasts. *PLOS Computational Biology*.

XVI. REVIEW OF LAWS, DISTRICT POLICIES, DISTRICT RULES AND PROCEDURES, DISTRICT TRAINING MATERIALS, AND OTHER DOCUMENTS:

The committee has reviewed the following non-exhaustive list of laws, policies, training materials, and other documents applicable to NWMAD to evaluate our compliance and to determine if any of the foregoing should be amended.

- State laws applicable to Mosquito Abatement Districts (70 ILCS 1005)
- Illinois Open Meetings Act (5 ILCS 120)
- Policy on Public Comment
- Designation of OMA officer (5 ILCS 120/1.05(a))
- All Officials have completed OMA Training (5 ILCS 120/1.05(b))
- Schedule of Meetings for Calendar or Fiscal Year (5 ILCS 120/2.03)
- Illinois Freedom of Information Act (5 ILCS 140)
- Designation of FOIA officer (5 ILCS 140/3.5(a))
- FOIA Officer Training (5 ILCS 140/3.5(b))
- Computation and Retention of FOIA Requests (5 ILCS 140/3.5(a))
- Posting Other Required FOIA Information (5 ILCS 140/4(a); 5 ILCS 140/4(b))
- List of Types or Categories of FOIA Records under District's Control (5 ILCS 140/5)
- Periodic Meetings to Review Closed Meeting Minutes (5 ILCS 120/2.06(d))
- IMRF Total Compensation Postings (5 ILCS 120/7.3)
- Designation of Whistleblower Auditing Official (50 ILCS 105/4.1)
- All Elected Officials have filed statements of economic interests (5 ILCS 420/4A- 101; 5 ILCS 420/4A-101.5)
- Sexual harassment prevention training (775 ILCS 5/2-109(c))
- District Intergovernmental Agreements
- District budget and financial documents
- State Ethics Laws

XVII. IN WHAT AREAS HAS THE NWMAD EXCELLED?

a. Budgeting

The NWMAD continues to be a responsible steward of taxpayer dollars. The per capita cost of comprehensive public health mosquito control is currently $4.71.

b. Program Offerings and Program Expansions

1. A tick surveillance program.
2. A domestic inspection program for residents where residents can have District personnel conduct inspections and source reduction activities on private property.
3. A quality control and research program that has published over 20 peer-reviewed articles and important scientific collaborations with the CDC and regional academic institutions.
4. Expanding the District's adult and larvae resistance testing to include

bottle bioassays, caged field trials, topical applications, and field trials.

5. Expanding the District's surveillance of adult and larval habitat to include the 2000 miles of stormwater sewer pipes located in the District. These stormwater pipes are prime habitats for the West Nile virus vector mosquitoes to overwinter and re-emerge the following spring.
6. Giving presentations about our operations to Village and Township boards.
7. Moved from wide area adulticide activities to more focused adulticide applications as warranted by the scientific data we collect and analyze daily.
8. The District will have a full state of the art Biosafety Level-2 PCR-based laboratory for pathogen testing within two years. The laboratory is capable of testing for any new tick or mosquito-borne pathogens that may arrive in the region.
9. The development of a revised website and new tools to inform the public of the risk of vector-borne disease within the District as well as routine treatment activities.
10. New transparency initiatives that make all treatment data, board meeting, information, financial information, audits, etc. available on our website.
11. The District website continues to serve as a valuable tool for residents to get information on mosquito and disease prevention, mosquito and tick repellents, links to public health partners and other resources. The NWMAD website is one of the most comprehensive local resources available for residents.

c. Collaboration

The NWMAD has participated in a range of collaborations to improve our program and protect public health including research collaborations with the CDC, Loyola University, University of Illinois, University of Wisconsin and adjoining mosquito abatement districts.

d. Staff Training and professional development

NWMAD full-time staff have access to a wide variety of training and education opportunities. Among the events that NWMAD staff participate in each year include:

- Illinois Mosquito and Vector Control Annual Meeting (14 hours).
- American Mosquito Control Association Annual meeting (40 hours).
- Various other training courses, webinars, and conferences, as necessary (varies).

XVIII. INEFFICIENCIES AND FUTURE CHALLENGES?

1. Climate Change. As yearly temperatures increase, and precipitation becomes less predictable – with more extremes of both it will be more difficult to predict and respond to population fluctuations and mosquito-borne disease outbreaks.

2. Introductions of non-native, invasive mosquito species. The District has already seen an introduction and establishment of two invasive species (*Ochelotatus japonicus* in 2007 and *Aedes albopictus* 2021). Both species can be significant nuisance biters and capable of

transmitting diseases such as Zika, Yellow Fever, Dengue, and Japanese Encephalitis.

3. Introduction of novel or re-emerging mosquito-borne diseases from overseas or from other parts of the nation and how MADs can detect and respond to them.

4. Outbreaks of other mosquito-borne diseases with their vector species found in our district. Other diseases transmitted by mosquitoes are found in the Midwest United States that haven't been found in the NWMAD area – yet.

Mosquito-Borne Diseases	State where it's been found
La Crosse Encephalitis	Illinois, Indiana, Iowa, Minnesota, Ohio, Wisconsin
St. Louis Encephalitis	Illinois, Indiana, Iowa, Kansas, Missouri, Ohio
Eastern Equine Encephalitis	Illinois, Indiana, Michigan, Ohio, Wisconsin
Jamestown Canyon Virus	Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, Wisconsin

5. Tick Surveillance and Tick-Borne Disease Detection. Now that the State of Illinois has approved Mosquito Abatement Districts to conduct Tick and Tick-borne disease surveillance (SB2938 - 70 ILCS 1005/7) there may be a need for more resources. Here is a list of known Illinois ticks and a table of tick-borne diseases in the Midwest and incidence status.

Blacklegged Tick (*Ixodes scapularis*)
American Dog Tick (*Dermacentor variabilis*)
Lone Star Tick (*Amblyomma americanum*)
Brown Dog Tick (*Rhipicephalus sanguineus*)
Gulf Coast Tick (*Amblyomma maculatum*)
Asian Longhorned Tick (*Haemaphysalis longicornis*)

Disease	States Found	Incidence Rate Trend
Lyme Disease	Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, Wisconsin	Increasing
Anaplasmosis	Illinois, Indiana, Iowa, Michigan, Minnesota, Ohio, Wisconsin	Increasing
Ehrlichiosis	Illinois, Indiana, Iowa, Kansas, Missouri, Ohio	Increasing
Rocky Mountain Spotted Fever	Illinois, Indiana, Iowa, Kansas, Missouri, Ohio	Stable
Babesiosis	Illinois, Indiana, Iowa, Michigan, Minnesota, Wisconsin	Increasing
Powassan Virus	Illinois, Indiana, Michigan, Minnesota, Wisconsin	Increasing

6. Hiring enough seasonal workers. In the past 5 years NWMAD, and most other districts have had a difficult time finding enough seasonal workers to fill all positions.

7. Sharing information. With the rise of social media, it has become more difficult to dispel disinformation about District operations - specifically, about NWMAD's adult mosquito control products.

8. Direct digital communications with residents of the District. NWMAD would like to have access to the "Citizen Alert" system which automatically sends out text and email to all citizens who opt-in to receive real time communications about emergencies and other important community news. Currently, the District has an opt-in, automated way of sending out prior notification of adult mosquito operations in residential neighborhoods and inform village communications departments of the District's planned activity so they can share it via their social media.

9. Over the past 5 years numerous districts throughout the country have started using unmanned aerial vehicles (UAV, Drones, or other means) for aquatic source detection, mosquito surveillance and treatment. This may be the direction the districts are moving especially in light of the difficulties in hiring enough seasonal employees.

10. Increased larval and adult insecticide resistance to mosquito control products.

XIX. THE COMMITTEE'S RECOMMENDATIONS REGARDING INCREASED ACCOUNTABILITY AND EFFICIENCY:

a. Efficiency:

- NWMAD should continue to regularly monitor safety rules to make sure the District stays in compliance with all safety laws and regulations.

- NWMAD should examine ways to have tick pathogen testing conducted either in-house or through agreement with state or federal entities to ensure the viability of a tick pathogen testing program over the long term.

b. Accountability:

- All records of the NWMAD are open to the public and subject to FOIA requests. The District maintains a website that is consistently updated with current information and serves as a contact point for all residents seeking information. No recommendations for improvements are made at this time.

c. Business/Administration:

- The District maintains permanent staff that provide a multitude of jobs and duties. The District prides itself on its personal connection with its residents. When residents call or visit the office, they speak to District staff directly who are able to address concerns or answer questions. No recommendations for improvements are made at this

time.

- NWMAD, in collaboration with third parties, should continue to scientifically assess mosquito control product efficacy and monitor for resistance to all the products the District uses, and rotate product usage when increased resistance is discovered.

- NWMAD should remain innovative and adaptable to meet the future challenges that are likely to appear.

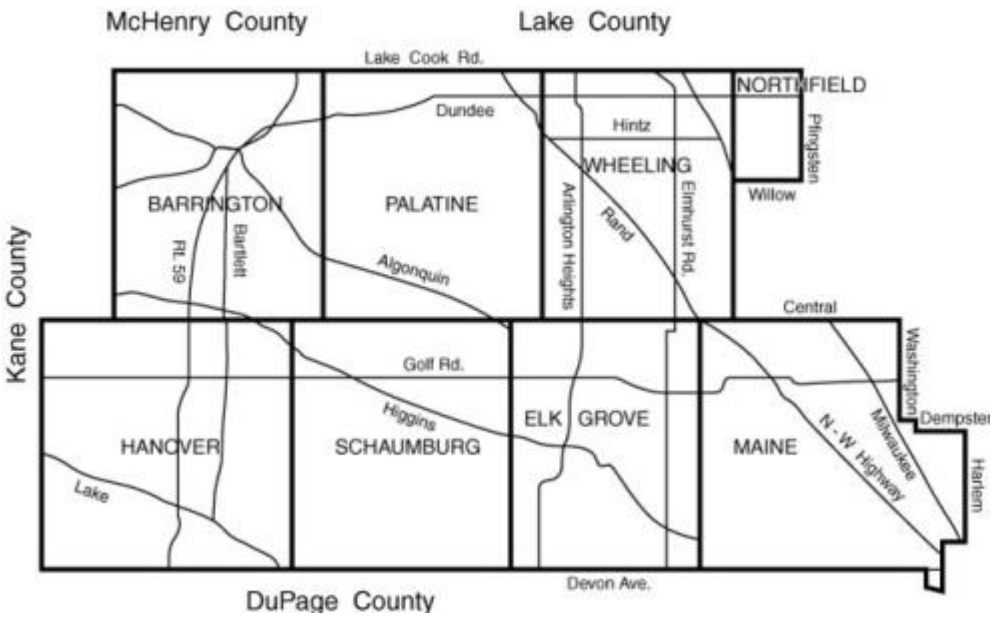
XX. CONCLUSION:

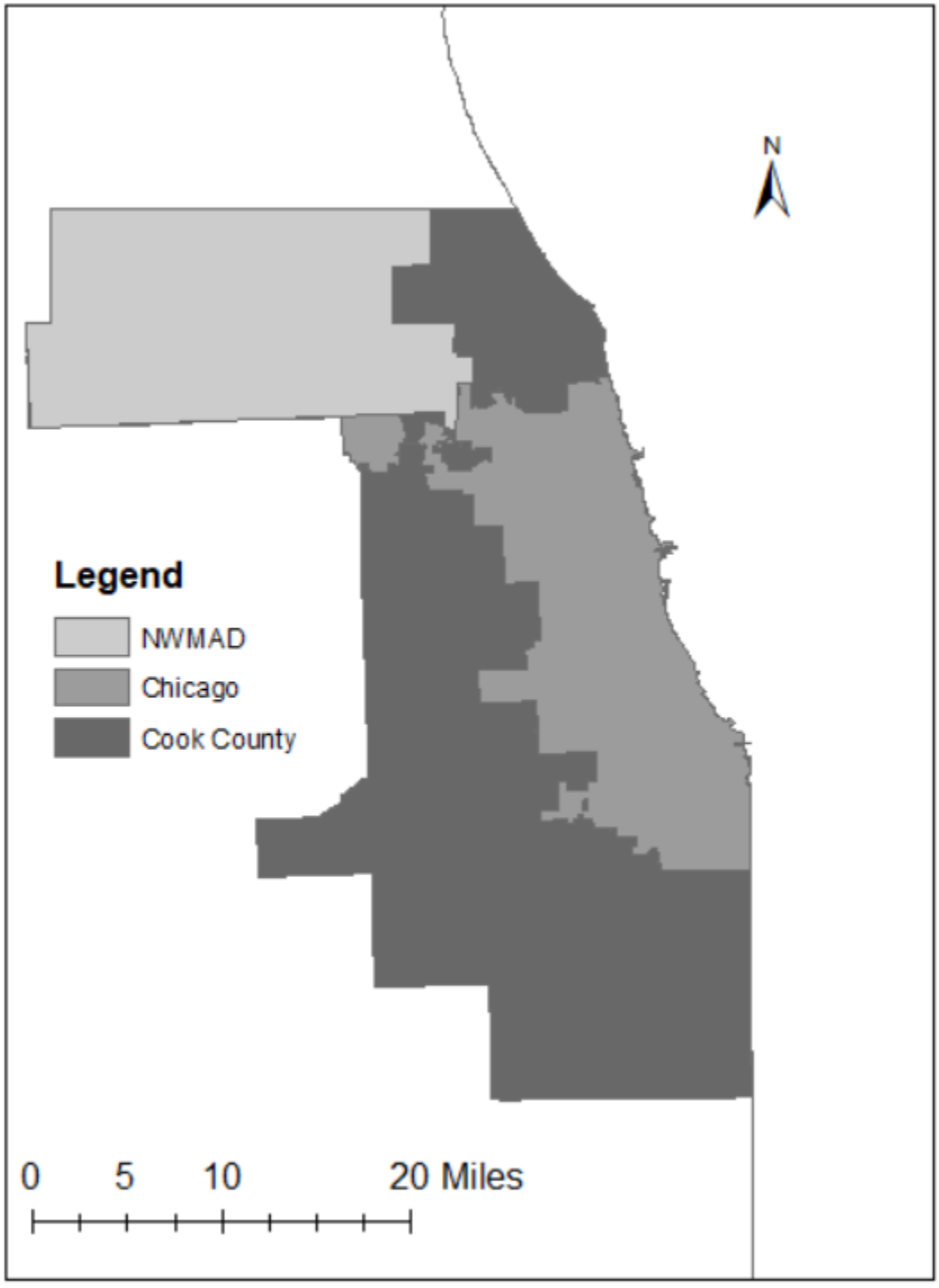
NWMAD, along with other mosquito abatement districts are special purpose entities whose functions are pivotal to maintaining the health and well-being of its residents. The NWMAD will continue to meet and adapt to any future challenges it encounters while striving to make the public health of its residents the main priority.

Report Submitted by: Carolyn Strahammer, Esq.
Attorney for the Northwest Mosquito Abatement District
Decennial Efficiency Committee of the Northwest Mosquito Abatement District

EXHIBIT A

NWMAD Jurisdiction

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