

**North Fork Mosquito
Abatement District**



*PO Box 1822
Paonia, CO 81428
970-527-6681
www.nfmad.org*

**ANNUAL REPORT 2017 (formerly COMPLIANCE
CERTIFICATION)
NORTH FORK MOSQUITO ABATEMENT
DISTRICT (NFMAD) 2017**

January 10, 2018

Notice of Status: Annual Report (Compliance Certification Filing)

A: NFMAD: **Small Entity Operator**, Mosquito Control Special District

Operator type: Mosquito control through application of all appropriate products, within the 50 square miles of the NFMAD District boundaries covered by this permit.

B: Contact Information:

NFMAD mailing address: PO Box 1822, Paonia, CO, 81428

Main Telephone voicemail: (970) 527-6681

Facility Address of Shed: 39939 O Rd., Paonia, CO, 81428

Office address: Hive Building Suite 200, Paonia, CO, 81428

Accounting: Robyn Reinhard (970) 527-4222

(nfmad81428@gmail.com)

DECISION MAKERS

The following are the Decision-makers who make up the PDMP Team, and their contact information:

1. Rain Klepper, Board President (970) 201-4909, 261-9065
2. Chris Tschinkel, Operations Manager (720) 984-9693
3. Glenn Austin, chair Operations Committee (970) 260-4298
4. Zach Hotchkiss, co-chair Operations Committee (970) 250-5542

Each Decision-maker is responsible for:

1. Managing pests in relation to the pest management area, interpretation of adult mosquito surveillance data and operations of control using physical and chemical means.
2. Developing and revising the PDMP
3. Developing, revising, and implementing corrective actions and other mosquito control requirements in accordance with surveillance data, threshold and response levels, and the bylaws of the NFMAD.

C: Signature on Annual Report Cover Sheet

PEST MANAGEMENT AREA AND OPERATIONS PLAN

D-1, D-2, D-4: Pest Management Area: The District area is 50 square miles, in the North Eastern area of Delta County known as the North Fork Mosquito Abatement District.

D-3: Map attached.

D-5: Operator

Pesticide applicators include Chris Tschinkel, the Operations and Field manager, the field crew under his direction, and Zach Hotchkiss, Board member.

D-8: This 2017 annual report (formerly Compliance Certification) covers all surface and outstanding waters within the North Fork District area. There are no water quality impaired waters in the District.

The North Fork of the Gunnison river runs through the NFMAD. Creeks include: Roat Cap, Jay, German, Bell, and a very small portion of Leroux. There are miles of irrigation canals, dry ditches, and also livestock ponds.

D-8: Every effort is made to avoid the discharge of pesticides of any form to the surface and outstanding waters of the District, however temporary drift may apply infrequently as the North Fork of the Gunnison river dries down to puddles and dry river bed, usually by July 4th, depending on weather and rainfall. With summer thunderstorms, pockets of potential breeding habitat occur in the river and creek beds, as well as the vast irrigation canals of the District area. All areas are monitored for physical mitigation, before larval products are applied. Adulticide spraying and/or fogging is only a last resort, and is never discharged onto the surface of the river or creeks.

D-9: There are no impaired waters in the NFMAD, and waters are not impaired by any substance which is an active ingredient in mosquito-control biological and chemical products utilized, or a degradeate of such an active ingredient.

D-10: PEST EVALUATION: Identification of Mosquito, Flying Insect Pest Problem

**In 2017, the 14 traps in the District were kept in tight control without three West Nile viral positives in trap pools, which were immediately remediated without incidence of human illness. Trap perimeters were placed prior to large scheduled events, such as the Delta County Fair, Cherry Days, and Picking in the Park, with great success. Given the tremendous level of adult mosquito presence in surrounding Districts, NFMAD trap counts were exceedingly low in

comparison. This is a direct result of the aggressive physical mitigation and larval surveillance programs. In 2017, the level of larval, pupal, and adulticide products used in the District decreased from previous years.

Mosquito control is necessary and essential to the area served by the North Fork Mosquito Abatement District due to the agricultural diversity present. There are vast irrigation waters that create mosquito breeding habitat for a number of mosquito species that potentially carry West Nile virus, and/or other mosquito-borne illnesses.

For NFMAD, the thresholds have been established using historical data from the District as well as 5 districts in Utah with similar terrain, the Colorado Mosquito Control division, Alameda Cty. Mosquito Control district, and the El Paso Board of Health thresholds for Culex species. We further refined the threshold levels in concert with the Delta County Board of Public Health director, K. Nordstrom, as well as the Colorado Dept. of Public Health. Population density was considered with all threshold levels for all products.

General location mapping is a strong aspect of the Operations plan. For NFMAD, this has been accomplished using ARC GIS ESRI software in concert with the Delta County Mapping GIS division, providing large wall maps that meet a higher level of requirements for surveying of the District treatment sites and all immediate boundaries. Surface waters are mapped, as well as rivers, tributaries of the rivers, ponds, irrigation ponds from mountain waters, organic and biodynamic farming locations, apiaries, and the springs that feed the internal waters on agricultural properties.

D-10: Thresholds, Response Levels, Trapping and Adult Identification, continued.

NFMAD has an extensive trapping program in place, using historical and current "hotspot" sites to define placement of CDC light traps, forming a perimeter around population dense areas, and recreational

sites. Adult surveillance trapping occurs once per week for sentinel traps. All data is posted to (www.nfmad.org) within 2 weeks.

Trap pools are then identified by numbers of each mosquito species present, using laminated photos of all stages of each species, through visual and microscopic methods. If presence of *Culex Tarsalis*, and/or *Culex Pipiens* are detected, a RAMP reader test for West Nile virus is run. Positive testing on RAMP, higher numbers compared to previous trapping, or an upcoming event triggers another level of action plan, according to stated thresholds, the Site Evaluation data for the identified problem area, the proximity of population centers or recreational areas, plus increased search for physical mitigation of breeding and drainage sites, and habitat management. Negative testing on RAMP analysis may trigger the same level of action plan as a Positive test if other factors are present, such as proximity to population, high numbers of *Aedes*, or other nuisance species, calendar events at schools or recreational parks and areas, historical data that supports the credible suspicion of an imminent threat, or human W. Nile viral infection, or other mosquito-borne illness in the area.

Identification of primary, most common targets of NFMAD program, including life cycle, habitat, identification factors, disease potentials, and methods of control with larval products matched to terrain, is the primary method of larval control. Identifying characteristics of each species is listed below, through all phases. Training is conducted for field crew, and each crew member carries a loupe to magnify and correctly identify the insect observed. Current dipping techniques are employed, and density within the site is recorded per dip, and dip count.

This PDMP is specific to the control of disease vector and nuisance mosquitoes within the North Fork district, including all species of Culicidae, in all life stages (eggs, larvae, pupae, and adults), and in all habitats in which they occur, as described below. Historically, 50 species of mosquitoes have been recorded in Colorado, of which the following are the primary targets of control efforts under this Operations Plan/ PDMP:

Culex Tarsalis

Culex Pipiens

Aedes Vexans (possible carrier of WNV and WEE, SLE) Known carrier of Heartworm for dogs and cats.

****A full description of the NFMAD Operations plan is available at (www.nfmad.org). Below is an excerpt on Larval surveying:**

Larval Surveys

Most of the equipment for larval surveillance may be commonly purchased at local stores, and is a cost-effective, efficient method of mosquito control. NFMAD performs extensive larval surveillance on sites that have historically shown breeding activity, as well as any newly reported or evaluated areas. Larvicide programs are targeted at controlling mosquito larvae before they leave the water. This strategy can be the most effective, most economical, and the safest method of controlling mosquito populations. Given that one adult mosquito can increase the mosquito population by hundreds every week to ten days, depending on adult control will doom the program to failure. Without a larval surveillance and mitigation plan that is extensive within the District, the incidence of mosquito-borne illness will inevitably rise. Chemical control, essentially adulticide sprays, do not have the level of success that would constitute mosquito control without a larvicide program, as well as a physical mitigation effort. Avoidance of pesticide usage by eradication of the mosquito populations earlier in the lifecycle allows NFMAD to decrease the discharge and application of pesticides into the environment.

A white plastic or metal dipper is used for collecting water from artificial and natural water sources, including ditches, margins of ponds, stagnant areas, culverts, etc., as described in Source Reduction site types, above. Estimates of larval population densities are obtained by counting the number of larvae per dip, using a standard size dipper. Three to five dips are taken, essentially every 10 feet around a site, noting and recording on the data card for the site, the number of dips taken, and the numbers of larvae in each dip, and the life stage of the larvae (instar 1-4), and presence of pupae. Water temperature is also recorded, and using this

combination of factors, an educated estimate as to when adult mosquitoes will emerge, and hence, what control efforts should be made, in what timing. Larvae generally develop faster in higher temperature water. Large numbers of pupae indicate a large number of adults will emerge within a few days, signaling an urgent priority for pupae treatment to prevent the hatch. Since pupae do not feed, larval products such as Bti that must be eaten by mosquito larvae are ineffective, and a pupacide must be added to the treatment protocol for successful mitigation. If larvae are present in instar 1 and 2, exclusively, it may be 8-10 days before adults emerge, depending on the species and temperature, hence larval products containing Bti or Bs may be suitable. Large numbers of pupal skins floating on the surface is a sign that adults have recently emerged, and adult control methods must be added. Accurate identification of species is useful in determining the appropriate larval control agent. For example, *Bacillus Sphaericus* is highly effective on *Culex* mosquitoes, but not *Anopheles*.

NFMAD maintains a voicemail telephone number, 970-527-6681, as a "mosquito hotline" where residents of the District can call with mosquito annoyance complaints, reports of standing water, or observance of crew behavior. Information obtained from these calls is used to help direct trapping efforts using floater traps, and the need for evaluation of a site not currently in the database.

With new site areas, or sites without historical data for a variety of reasons, proximity to populated areas is given higher factor-weight.

In addition to trapping, NFMAD includes surveillance of possible daytime resting stations for adults, both natural and manmade. These include houses, barns, sheds, privies, bridges, culverts, hollow trees, overhanging cliff areas, and foliage.

RESPONSE LEVELS OF NFMAD 2017

NFMAD surveillance and response plan is based on the federal regulations for the state of Colorado Permit published 3/15/13, hence, on conditions at three levels: Normal season, Emergency planning, and Epidemic. Five risk factors are analyzed to determine the appropriate response level:

1. Environmental condition: snowfall, rainfall, temperature, previous to current season
2. Adult mosquito vector species, "abundance"
3. Viral test positives on RAMP and/or PCR
4. Human cases of mosquito-borne illness, including West Nile and SL Encephalitis
5. Proximity of detected viral activity in relation to population areas

Each of these risk factors counts as 1 point, with 5 points representing conditions indicative of a high risk of human infection with a mosquito-borne virus.

NOTE: Full Response Levels and Thresholds are published on the (www.nfmad.org) website.

2017 Thresholds for Adult Mosquito Mitigation

Threshold levels are determined based on federal Center for Disease Control (CDC) mandates as of 3/15/13, and the Colorado Department of Public Health rules and regulations for Mosquito Abatement Special Districts during Epidemic designation. In December of 2012, the CDC reclassified West Nile viral infection as an epidemic, and as a result, NFMAD has significantly altered the operations plan. Historical data from the years 2008 through 2016 have been compiled and analyzed for each grid map of the District in preparation for the 2017 season.

Threshold levels are always expressed as a scale of modifiers, meaning that trap data, proximity to denser population areas, calendar of community events, presence of human W. Nile infections in the last year, and other historical data, are all considered when making a treatment decision. Threshold levels are not simply counting particular species in a trap pool, as much more needs to be considered.

Area with Higher Population Density:

*1-20 Culex species mosquitoes in trap: Perform RAMP TEST

WITH POSITIVE RAMP: *Go to Phase I of Adulticide protocol with targeted, focused spraying, using backpack or ATV mounted, calibrated equipment

WITH NEGATIVE RAMP:

*Go to Phase 1 Adulticide protocol if there are human West Nile cases in area of trapping, and/or a strong, credible suspicion of infected Culex presence based on historical data.

In addition:

*Expand breeding site search, larval and pupal treatment by .25 mile.

*Evaluate site for possible physical mitigation

*Contact immediate landowners for cooperative mitigation effort and warning of illness possibility

*Re-trap after adulticide application to determine success of treatment.

*Re-trap again in one week:

if Culex numbers do not drop: Advance to Phase 2 of Adulticide protocol, and expand search/treatment to .50 mile, in accordance with NPDES and CDC response level requirements.

Area with Lower Population Density:

*1 culex triggers RAMP testing, 10 and above Culex species in trap is treated the same with modifiers as Area of Higher Population

Total Mosquitoes, non-specified species:

*150 total count and above mosquitoes in trap:

Consider historical evidence of West Nile presence, as well as other modifiers detailed above, and trigger Phase 1 Adulticide protocol due to potential for human disease, if non-specified species are acting as an indicator for W. Nile carrying species such as Culex.

For a Scheduled Community Event:*Increase surveillance, including trapping, 2-3 weeks prior to event. in a tight perimeter. Increase all preventive, physical mitigation, larval and pupal product applications, and widen the search for breeding habitat that could cause adult mosquitoes populations to rise in the park or recreational arena hosting the community event.

*Apply Adulticide if indicated and appropriate, according to higher population density modifiers.

NOTE: Full Response Levels and Thresholds are published on the (www.nfmad.org) website.

D-10B: PHYSICAL MITIGATION Prevention, Education, and Source Reduction through Physical Mitigation Approaches

**In 2016 and 2017, multiple large scale physical mitigation projects have been completed, or progressed further, with the full support of the Board of County Commissioners, and the towns of Hotchkiss and Paonia. The limiting factor has been finances, as well as weather patterns. A full listing of ongoing physical mitigation projects will continue in spring of 2018, if grant applications are approved. Otherwise, NFMAD fully supports residents with privately funded projects, and Public Works.

Primarily prevention is accomplished through education. NFMAD maintains an extensive website (www.nfmad.org), with information for the general public, including actions they can take to avoid creating mosquito habitats in areas under their personal control, and

ways to reduce the risk of contracting West Nile virus or other mosquito-borne illness. Prevention education also includes information on proper use of mosquito repellents for various age groups. Community outreach and education continues, with the production of brochures and other informational handouts, given out at local events and available in local farm and feed stores that sell larvicides.

The North Fork Mosquito Abatement District (NFMAD) will continue to conduct source reduction and enhancement of drainage/terrain to reduce mosquito breeding sites as part of the prevention plan. This is essential to the success of mosquito abatement, comfort for residents, and safety from mosquito-borne illness, and protection of our outstanding waters, rivers, ponds, and springs.

Prevention and education are the cornerstones of the NFMAD program, and necessary to reduce the need and usage of pesticides in general. Cooperative efforts between the District, and private homeowners, the towns, the county, the railroads, the mines, and federal lands are an integral part of successful mitigation, and ultimate eradication, of mosquito-borne illness.

Examples of physical/mechanical methods include emptying containers holding water in residential neighborhoods, cleaning junk, tires, etc., that can hold water from land, removing animal and manmade dams such as beaver dams, draining water from irrigated fields, opening drainage ditches using hand tools or backhoe, controlling irrigation tail water.

Site evaluation forms the basis of preventive measures. Below are the instructions for NFMAD's Site Evaluation Form, completed for every site that may require physical and/or chemical mitigation for mosquitoes.

Source Reduction is the most effective mosquito control in current use, and creates success without the use of pesticides, hence less issues with discharge to the surface waters of Colorado.

The District continues to use all physical and mechanical methods available, both by paid crew and volunteers, to reduce mosquito breeding sites where possible with permission of property owners, either private or public, with the purpose of reducing pesticide usage. All mechanical and physical methods of mitigation and reduction of breeding sites in the NFMAD area are based on site evaluation and remediation planning. prints from livestock, etc., as well as urbanization of natural environments. A full range of physical mitigation is employed, including controlled burning, weed reduction, backhoe and trackhoe shifting of drainage, installation of piping, opening of irrigation canals, and more, all with the intent to get water back to the river efficiently and safely, while reducing stagnant and standing water areas that are prime breeding sites.

NFMAD will continue to work with private residential property owners, farmers and ranchers, township properties, and county properties, to conduct proper water management with the purpose of reducing pesticide usage. Examples of cultural methods of mitigation include allowing irrigated fields to dry down within 5 days, opening drainage to allow irrigation water to return to the river rather than becoming standing puddles, and pasturing livestock in a manner that reduces hoof prints holding water.

D-11: Start and End Dates : The NFMAD season begins April 1st with physical mitigation, prevention and education meetings with residents and county entities, and training of crew. The trapping program begins in sentinel zones on April 15th, weather dependent. The season typically concludes by September 30th, again depending on weather, and may run as late as October 31st.

D-12. Product Information

NFMAD only uses calibrated and droplet tested equipment, including truck mounted spray units with Smart Flow, ATV mounted spray units

(2), Handheld Mozzie units (2), Maryuama Sprayer backpacks (16), and various handheld units.

**In 2017, 90% of product applications were larval, with a small percentage of pupal, with 10% adulticide used in a targeted manner.

Products:

Aquabac/BTi EPA registration : 62637-3

Spherotax/ Bs EPA registration: 84268-2

Altosid briquettes: EPA Registration: 2724-375

Altosid XRG granules EPA Registration: 2724-451

BVA larvicidal oil: EPA Registration: 70589-1

Mavrik Perimeter EPA Registration: 2724-478

PermX/Pursuit EPA Registration: 655-898

Zenivex: EPA Registration: 2724-807

D-13: **Visual Monitoring** is conducted before, during, and after application of all pesticide products.

D-14: **Adverse Effects**

No adverse effects were observed during any form of pesticide application in the NFMAD in 2017. Extensive spill training is conducted with the crew, along with weekly safety classes. Spill procedures and kits are present in each treatment truck.

**Annual Report Required Signature on Cover Sheet by
Rain Klepper, President, NFMAD Board of Directors**