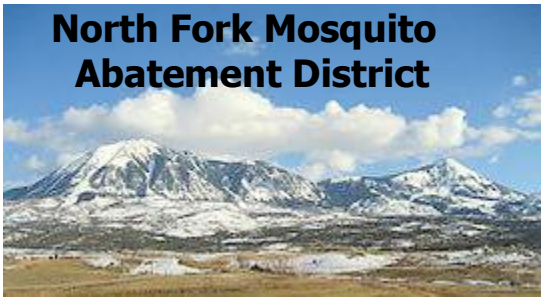

PO Box 1822
Paonia, CO 81428
970-527-6681
www.nfmad.org

ANNUAL REPORT 2018 (formerly COMPLIANCE CERTIFICATION)
NORTH FORK MOSQUITO ABATEMENT DISTRICT (NFMAD) 2018 COG 860036

January 15, 2019

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, physical mitigation, and resident education 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

(The office was moved to the 39939 O Rd. property on

December 21, 2018)

B-6: All fees and billing should be directed to:

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 Operation 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, yearly, with crew education
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

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. On the basis of my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations"

Rain Klepper, President, Board of Directors, NFMAD

(rainklep@hotmail.com)

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 (NFMAD).

D-3:

Maps 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 2018 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 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 never discharged onto the surface of the river or creeks.

2018 was an extremely challenging season for mosquito control, given drought conditions throughout the valley, combined with high temperatures and wildfire smoke. The North Fork of the Gunnison river was far lower in volume, dropping earlier than the previous 40 years, and many of the irrigation ditches ran out of water months before the usual stop dates. This forced the high use of domestic water sources, and alternate irrigation methods.

These conditions, combined with infrequent but heavy rainstorms, eliminated many mosquito sources while simultaneously creating others. Given that the NFMAD spans 50 square miles, with a small and insufficient budget for mosquito control, the crew did a tremendous job controlling adult mosquitoes. The aggressive physical mitigation program of the last 6 seasons has had beneficial impact on operations throughout the District, and in the 2018 season, made all the difference.

Despite all of these challenges, our crews aggressively treated areas known to hatch mosquitoes throughout the 50 square miles of the District and endeavored to locate and map all new transitional sources. Public reporting helped immeasurably in locating areas previously unknown or newly created.

When numbers of adult mosquitoes were identified, or a positive RAMP test occurred, those areas were rapidly target fogged with both truck-mounted sprayers and ATV units. The fogging was always followed by extensive trapping, site evaluation for breeding

areas, and larval treatment. As always, public venues were both given priority and barrier treated to keep mosquitoes away during events or gatherings.

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 degredate of such an active ingredient.

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

Sentinel Trapping

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. More frequent trapping is employed if there is a WNV positive on RAMP, or a service request from a resident.

Identification

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 the 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 on the website, (www.nfmad.org) 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.

Identification and treatment 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 the NFMAD Operations Plan:

Culex Tarsalis: carrier species of WNV

Culex Pipiens: carrier species of WNV

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

*NFMAD laboratory team also notes presence of Occhlerotatus, Culiseta, and Anopheles species in trap pools as part of ongoing research.

**In 2018, the 16 traps in the District had abnormally low numbers of adult mosquitoes, except after several microburst wind storms. The drought, coupled with heavy rainstorms and high winds on occasion, made analysis of trap data more difficult, so NFMAD added trapping sites, and did frequent multi-weekly checks on known hotspot areas, as well as public venues like the Delta County Fairgrounds. There were several West Nile viral positive trap pools according to the RAMP reader, for the first time in 4 years.

West Nile virus, (WNV) is endemic in Culex mosquito populations and this season the virus was extremely virulent in Delta County. As in prior seasons, the unique possession of the RAMP reader allowed the crew to rapidly identify, target and treat areas of WNV positive infection, within as little as 4 hours after test results. If initial measures, including extensive trap perimeters surrounding the positive trap area, site evaluation and target fogging were not immediately successful in eradicating the WNV readings on the RAMP, the next level of crew response was employed, moving the search perimeter out in quarter-mile increments. Any area of continuing positive trap pools was monitored and extensively treated, every 2-3 days.

As always, the public was notified to take extra personal precautions to avoid the illness. Unfortunately, there were several human cases of WNV reported in the North Fork District area, for the first time since 2013. Upon investigation and interview of those affected, most of the 6 cases confirmed by laboratory testing were bitten outside of the District, with 2 confirmed in another county,

but this is no comfort to those who have contracted the virus or have loved ones who have become ill.

The challenging issues of the 2018 season were also increased dramatically as a result of more than one third of Delta County having no mosquito control at all. This causes pressure particularly on the southern, eastern, and western borders of Hotchkiss, which are synonymous with the District borders, and this town also hosts the Delta County Fairgrounds.

NFMAD will continue to aggressively work to control the mosquito population and strive to increase our effectivity while respecting both the health of the residents and the environment. This is a thin and sharp line to tread as neither mosquitoes or WNV will be completely eradicated with current technology, despite surveillance and response tactics, including adulticide. In this agricultural community, mosquitoes and water go hand in hand.

Trap Counts for 2018 Season

Trap #1 Zack's BBQ area	Aedes	Culex	Other	Total	RAMP	NOTES
6/5/2018	1	1	1	3	N/A	
6/11/18	1	4	5	10	neg	
6/18/18	9	17	6	32	<10	
Additional 6/18 trap	9	7	0	16	neg	
6/24/18	2	14	10	25	<10	
7/1/18	0	5	8	13	neg	
7/15/18	50	2	3	55	neg	
7/22/18	75	38	44	157	11.8	
7/29/18	26	36	41	103	27.8 Neg	
8/6/18	0	4	2	6	neg	
Trap #1 Zack's BBQ area	Aedes	Culex	Other	Total	RAMP	NOTES
8/13/18	39	25	8	72	Cluster 640 +	
8/20/18	54	17	11	82	<10	
8/27/18	139	28	10	171	640 +	Culex Pipiens dominated for the first time in years
9/3/18	52	23	19	94	<10	

Trap # 2: Fairgrounds Primary	Aedes	Culex	Other Species	Total	RAMP
6/5/18	4	1	3	7	neg
6/11/18	0	1	0	1	N/A
6/18/18	7	5	6	18	neg
6/18/18, second trap	4	2	59	65	neg
6/24/18	1	0	0	1	N/A
6/24/18, second trap	0	0	1	1	N/A
7/1/18	0	3	0	3	neg
7/1/18, second trap	0	12	2	14	19.7 combo test
7/8/17, rained out					
7/15/18	4	12	1	17	<10.0

Trap # 2: Fairgrounds Primary	Aedes	Culex	Other Species	Total	RAMP
7/22/18	19	18	2	39	11.8, combo test
7/29/18	18	56	24	98	Cluster 27.8
8/6/18	1	0	4	5	N/A
8/13/18	12	11	2	25	Cluster: 640
8/20/18	20	2	4	26	N/A
8/27/18	6	0	3	9	N/A
9/3/18	7	4	7	18	neg

Trap #3 Lorah Lane area	Aedes	Culex	Other Species	Total	RAMP
6/8/18	4	26	4	34	<10.0
6/11/18	1	25	3	29	<10.0
6/18/18	5	11	5	21	<10.0
6/24/18	4	18	2	24	<10.0
7/1/18	4	43	7	54	19.7, combo test
7/8/18, rained out					
7/22/18	18	24	11	53	11.8, combo test
7/29/18	37	38	39	114	Cluster: 27.8
8/6/18	0	19	1	20	Cluster: 152.4
8/13/18	21	17	4	41	Cluster 640 +

Trap #3 Lorah Lane area	Aedes	Culex	Other Species	Total	RAMP
8/20/18	27	13	3	43	<10
8/27/18	35	16	6	57	<10
9/3/18	24	3	7	34	neg

Trap #4 Shifflet/Willow Hts area Non-Sentinel, as needed	Aedes	Culex	Other	Total	RAMP	NOTES
6/8/18	0	9	1	10	neg	
6/11/18	0	9	0	9	neg	
6/18/18	1	16	2	19	<10.0	
6/24/18	1	9	0	10	neg	
7/1/18	0	19	2	21	640, combo test	
7/15/18	0	2	0	2	neg	
7/22/18	0	0	0	0	0	trap failure??
7/29/18	2	32	22	56	640+	
8/6/18	2	9	11	22	152.2	
8/13/18	2	16	4	22	cluster:	
8/20/18	4	11	2	17	neg	
8/27/18	3	7	3	13	<10	
9/3/18	0	3	0	3	neg	

Trap #5 West Hotchkiss (BK)	Aedes	Culex	Other Species	Total	RAMP	NC
6/8/18	0	2	3	5	neg	
6/11/18	2	1	1	4	neg	
6/18/18	1	1	12	14	neg	
6/24/18	0	5	5	10	neg	
7/1/18	0	2	3	5	640, combo test	
7/15/18	15	0	1	16	N/A	
7/22/18	17	17	16	50	<10.0	
7/29/18	15	11	136	162	Cluster <10	
8/6/18	25	5	14	44	neg	
8/13/18	44	12	49	105	Cluster 640	

Trap #5 West Hotchkiss (BK)	Aedes	Culex	Other Species	Total	RAMP
8/20/18	9	9	11	29	Neg
8/27/18	8	0	29	37	N/A
9/3/18	9	5	14	28	neg

Trap # 6 **Non-Sentinel Old Water Treatment Plant area	Aedes	Culex	Other Species	Total	RAMP
6/5/18	59	3	3	65	neg
6/11/18	52	8	6	66	neg
6/18/18	23	1	1	25	neg
6/24/18	36	15	2	53	<10.0
7/1/18	7	9	0	16	640. combo test
7/15/18	17	10	5	32	<10.0
7/22/18	84	31	7	122	<10.0, combo test
7/29 Trap failure					
8/6/18	29	2	0	31	neg
8/13/18	46	0	8	54	N/A

Trap # 6 **Non-Sentinel Old Water Treatment Plant area	Aedes	Culex	Other Species	Total	RAMP
8/20/18	95	0	3	98	n/a
8/27/18	56	1	1	58	neg
9/3/18	125	4	5	134	<10

Edit

Trap # 7: Bell Creek Rd. area	Aedes	Culex	Other Species	Total	RAMP
6/5/18	2	0	19	21	N/A
6/12/18	11	5	9	25	neg
6/17/18	12	2	4	18	neg
6/25/18	9	7	3	19	neg
7/2/18	1	16	0	17	14.4, combo test
7/16/18	6	7	1	14	38.1, combo test
7/23/18	1	0	0	1	N/A
7/30/18	188	54	25	267	Cluster 640 +
8/5/18	111	98	22	240	Cluster 24.5
8/12/18	57	51	9	117	Cluster 640 individual: 17.8

Trap # 7: Bell Creek Rd. area	Aedes	Culex	Other Species	Total	RAMP
8/19/18	55	8	8	71	neg
8/26/18	98	14	4	116	<10
9/3/18	62	44	8	114	<10

Trap #8 Pond Z area	Aedes	Culex	Other Species	Total	RAMP	NOTES
6/5/18	1	22	4	27	<10.0	
6/12/18	1	14	4	19	neg	
6/17/18	2	11	2	15	neg	
6/24/18	0	0	0	0	N/A	trap failure?
6/25/18, re-trap	0	28	1	29	<10.0	
7/2/18	0	15	0	15	14.4, combo test	
7/16/18	28	2	5	35	neg	
7/23/18	6	0	5	6	N/A	
7/30/18	7	60	2	69	cluster 640 +	
8/5/18	28	67	5	100	Cluster: 24.5	

Edit

Trap #8 Pond Z area	Aedes	Culex	Other Species	Total	RAMP
8/12/18	8	87	4	98	Cluster 640 +
8/19/18	3	32	2	37	640 +
8/26/18	2	21	2	25	neg
9/3/18	27	50	10	87	<10

Trap # 9 Skyhill Pond area Non-sentinel, as needed	Aedes	Culex	Other Species	Total	RAMP	NOTES

Trap #10 German Creek, GZ areas Non-sentinel	Aedes	Culex	Other Species	Total	RAMP
6/5/18	1	2	0	3	neg
6/12/18	0	5	1	6	neg
6/17/18	0	2	0	2	neg
6/25/18	1	4	3	8	neg
7/2/18	2	4	0	6	neg
7/16/18	3	28	1	32	<10.0
7/23/18	1	0	0	1	N/A
7/30/18	0	12	0	12	Cluster 75.3
8/5/18	2	25	3	30	Cluster <10
8/12/18	0	26	2	28	Cluster 640 +

Edit

Trap #10 German Creek, GZ areas Non-sentinel	Aedes	Culex	Other Species	Total	RAMP
8/19/18	1	17	0	18	<10
8/26/18	3	7	0	10	neg
9/3/18	4	2	1	7	neg

Trap # 11 Hadley Rd area Non-sentinel, as needed	Aedes	Culex	Other Species	Total	RAMP
6/5/18	6	1	3	10	neg
6/12/18	4	0	3	7	N/A
6/17/18	8	2	5	15	neg
6/25/18	55	9	16	80	neg
7/2/18	5	14	66	85	neg
7/16/18	6	6	10	22	neg
7/23/18	2	30	5	37	<10.0
7/30/18	4	20	7	31	Cluster 75.3
8/5/18	5	31	7	43	cluster <10
8/12/18	2	22	1	24	Cluster 640 +

Trap # 11 Hadley Rd area Non-sentinel, as needed	Aedes	Culex	Other Species	Total	RAMP
8/19/18	3	22	0	25	<10
8/26/18	3	4	0	7	neg
9/3/18	5	6	3	14	neg

Trap #12 R-25 Rd. Non-sentinel	Aedes	Culex	Other Species	Total	RAMP
6/5/18	7	1	1	9	neg
6/12/18	trap failure?			0	
6/17/18	0	1	1	2	neg
6/25/18	0			0	
7/2/18	8	5	1	14	neg
7/10/18	40	2	3	45	neg
7/23/18	25	20	4	49	<10.0
7/30/18	4	7	3	14	<10
8/5/18	5	11	0	16	<10
8/12/18	3	6	0	9	neg

Edit

Trap #12 R-25 Rd. Non-sentinel	Aedes	Culex	Other Species	Total	RAMP
8/19/18	1	1	0	2	neg
8/26/18	2	0	0	2	N/A
9/3/18	1	2	1	4	neg

Edit

Trap # 13 Campbell Rd.	Aedes	Culex	Other Species	Total	RAMP
6/5/18	0	2	5	7	neg
6/11/18	0	3	1	4	neg
6/18/18	0	8	5	13	neg
6/24/18	0	2	3	5	neg
7/1/18	0	16	6	22	17.9, combo test
7/15/18	5	21	5	31	640, combo test
7/22/18	22	18	21	61	640, combo test
7/29/18	7	15	14	36	Cluster <10
8/26/18	4	14	16	34	Cluster <10
8/13/18	1	12	19	32	Cluster 640 +

Edit

Trap # 13 Campbell Rd.	Aedes	Culex	Other Species	Total	RAMP
8/20/18	1	2	0	3	neg
8/27/18	8	9	7	24	neg
9/3/18	2	5	1	8	<10

Trap # 14 Pumpkin Hollow Rd.	Aedes	Culex	Other Species	Total	RAMP
6/5/18	98	8	13	119	neg
6/11/18	36	10	3	49	neg
6/18/18	29	2	4	35	neg
6/24/18	54	6	2	62	neg
7/1/18	99	55	3	157	17.9, combo test
7/15/18	70	12	11	93	640, combo test
7/22/18	104	45	6	155	640, combo test
7/29/18	94	46	7	147	cluster <10
8/6/18	160	12	6	178	Cluster <10
8/13/18	185	20	5	210	cluster 640 +

Trap # 14 Pumpkin Hollow Rd.	Aedes	Culex	Other Species	Total	RAMP
8/20/18	99	17	3	119	neg
8/27/18	96	7	2	105	neg
9/3/18	17	1	1	19	neg

Edit

Trap # 15 Paonia Water Tx, East Pumpkin Hollow areas	Aedes	Culex	Other Species	Total	RAMP
6/5/18	0	1	3	4	neg
6/11/18	5	22	3	30	<10.0
6/18/18	1	9	0	10	neg
6/24/18	0	7	1	8	neg
7/1/18	3	17	3	23	17.9, combo
7/15/18	25	84	27	136	60.2, combo test 640
7/22/18	23	33	12	68	<10.0
7/29/18	45	53	7	105	640 +
8/6/18	27	28	5	60	Cluster <10
8/13/18	3	95	4	102	Cluster 640 +

Trap # 15 Paonia Water Tx, East Pumpkin Hollow areas	Aedes	Culex	Other Species	Total	RAMP
8/20/18	8	49	18	75	15.8
8/27/18	23	7	6	36	neg
9/3/18	0	19	3	22	<10

Trap #16 Volunteer Park	Aedes	Culex	Other Species	Total	RAMP
6/5/18	3	0	2	5	N/A
6/12/18	7	5	1	13	neg
6/17/18	42	1	0	43	neg
6/25/18	12	3	0	15	neg
7/2/18	41	14	8	63	14.4, combo test
7/16/18	109	32	9	150	38.1, combo test
7/23/18	trap failure				
7/30/18	72	36	5	113	<10.0
8/5/18	287	47	12	346	Cluster 640 +
8/12/18	742	47	17	806	Cluster 640 +

Trap #16 Volunteer Park	Aedes	Culex	Other Species	Total	RAMP
8/19/18	270	34	3	308	<10
8/26/18	237	9	0	246	neg
9/3/18	100	4	8	112	neg

Trap # 17 Lund Rd area	Aedes	Culex	Other Species	Total	RAMP	NOTES
6/5/18	64	7	5	76	neg	
6/12/18	82	9	21	112	neg	
6/17/18	314	4	10	328	neg	
6/25/18	263	15	29	297	neg	
7/2/18	42	12	5	59	14.4, combo test	
7/16/18	199	134	17	350	38.1, combo test	
7/23/18	5	15	6	26	<10.0	
7/30/18	190	51	13	254	Cluster 640 +	
8/5/18	439	122	16	577	Cluster 640 +	
8/12/18	60	124	16	200	cluster 640 +	

Trap # 17 Lund Rd area	Aedes	Culex	Other Species	Total	RAMP
8/19/18	82	95	10	187	<10
8/26/18	55	27	15	97	<10
9/3/18	38	34	18	90	<10

Thresholds and Response Levels

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 County. 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, Ken Nordstrom, as well as the Colorado Department of Public Health and Environment guidelines. Population density was considered with all threshold levels for all products.

RESPONSE LEVELS OF NFMAD 2018

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.

2018 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 2017 have been compiled and analyzed for each grid map of the District in preparation for the 2018 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 the 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 mosquito 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.

Operations Mapping, Larval and Adulticide Treatments

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.

Extensive site mapping continues throughout the District, identifying physical mitigation projects, burn sites, breeding areas, irrigation leaks, etc. during site evaluations. Larval products are matched to terrain, and presence of adults, particularly landing counts are noted. If pupal skins, or other signs of a recent hatch are found, targeted fogging is employed.

In 2019, NFMAD has purchased the Frontier Precision Field Seeker software system to further utilize mapping, and map analysis for all phases of operations, including surveillance, larval and adulticide treatments.

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

Larval Surveys

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. 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 correspondingly 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.

The new Field Seeker software also has the capacity to receive service call requests, and hotline tips.

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.

In 2018, the severe drought and subsequent issues included adult mosquitoes seeking daytime resting areas that were humid and shaded, creating an entirely new environment that had to be treated effectively. Barrier spraying was employed at parks, playground areas, fairgrounds, sporting fields, and venues, with great success , as well as using Terminix bait to draw adults into a

"kill zone" of targeted adulticide.

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

Prevention and education are the cornerstones of the NFMAD program. 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.

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.

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 mosquito breeding habitat. 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.

From 2014 to 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, but NFMAD successfully negotiated several grant bequests, allowing projects to progress and be completed. Unfortunately, in 2018 promised funds did not materialize, but many of the ongoing projects were completed despite these setbacks. County mill levy funds due to NFMAD were also withheld, due to bankruptcy of the Bowie mines, and other issues.

The North Fork Mosquito Abatement District 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, safety from mosquito-borne illness, and protection of our outstanding waters, rivers, ponds, and springs. The District continues to work with residents and local agencies and officials to alter and mitigate mosquito breeding sites, and improve drainage.

A continuing list of burn sites was compiled at the end of the 2018 season, which take place in February to April, depending on weather. The Hotchkiss Fire department has been instrumental in safely burning off a variety of sites. Last season a drone was added to the equipment, giving NFMAD aerial film to add information to our maps.

A large backhoe project over the last 3 seasons was completed in 2018 in the Hidden Valley subdivision, reducing the need for treatment by more than 50%.

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, utilizing the website and NFMAD Facebook page, as well as brochures, lectures, and public service announcements.

D-11: Start and End Dates : The NFMAD crew season begins April 1st with physical mitigation, prevention and education meetings with residents and county entities, and training of crew. Burning for physical mitigation begins in February, completing by mid-April at the latest, depending on weather. The trapping program begins in sentinel zones in May, if the late spring is warm, or in early June, if it is cooler. The season typically concludes by September 30th, again depending on weather, and may run as late as October 31st.

In 2018, the first larvae were observed behind the Maloney house on the Delta County Fairgrounds on May 11th. The last adulticide spraying was early October, also in Hotchkiss.

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 (8), and various handheld units.

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 EPA Registration: 655-898

Zenivex: EPA Registration: 2724-807

In 2018, the following amounts of product were applied in the District:
Altosid: 266 briquettes
Altosid granules: 320 pounds
Aquabac: 1080 pounds
BVA oil: 83 gallons
Mavrik perimeter: 1 gallon
Terminix (attractant bait, garlic sugar, no EPA #): 8.5 gallons
Pursuit ULV-4-4: 97 gallons
Spheratax: 240 pounds
Zenivex: 5 gallons

D-13: Visual Monitoring

Visual monitoring is performed with every product application, before, during, and after treatment.

D-14: Adverse Effects

No adverse effects were observed during any form of pesticide application in the NFMAD in 20158. 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 2018 respectfully submitted by Rain Klepper, President, Board of NFMAD Directors 1/21/19

Signatures are present on cover page.