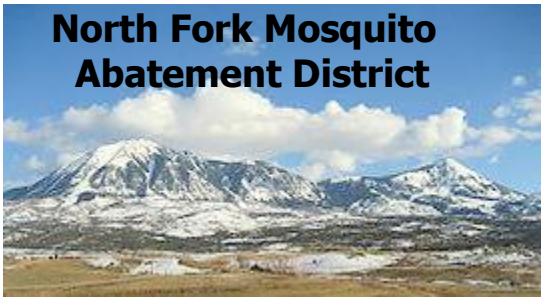


PO Box 1822
Paonia, CO 81428
970-527-6681
www.nfmad.org

ANNUAL REPORT 2019 (formerly COMPLIANCE CERTIFICATION)
NORTH FORK MOSQUITO ABATEMENT DISTRICT (NFMAD) 2019 COG 860036

January 15, 2020

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

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:

Rain Klepper, Board President (970) 201-4909, 261-9065
Garrett Park, Operations Manager (970) 319-2228
Glenn Austin, chair Operation Committee (970) 260-4298
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

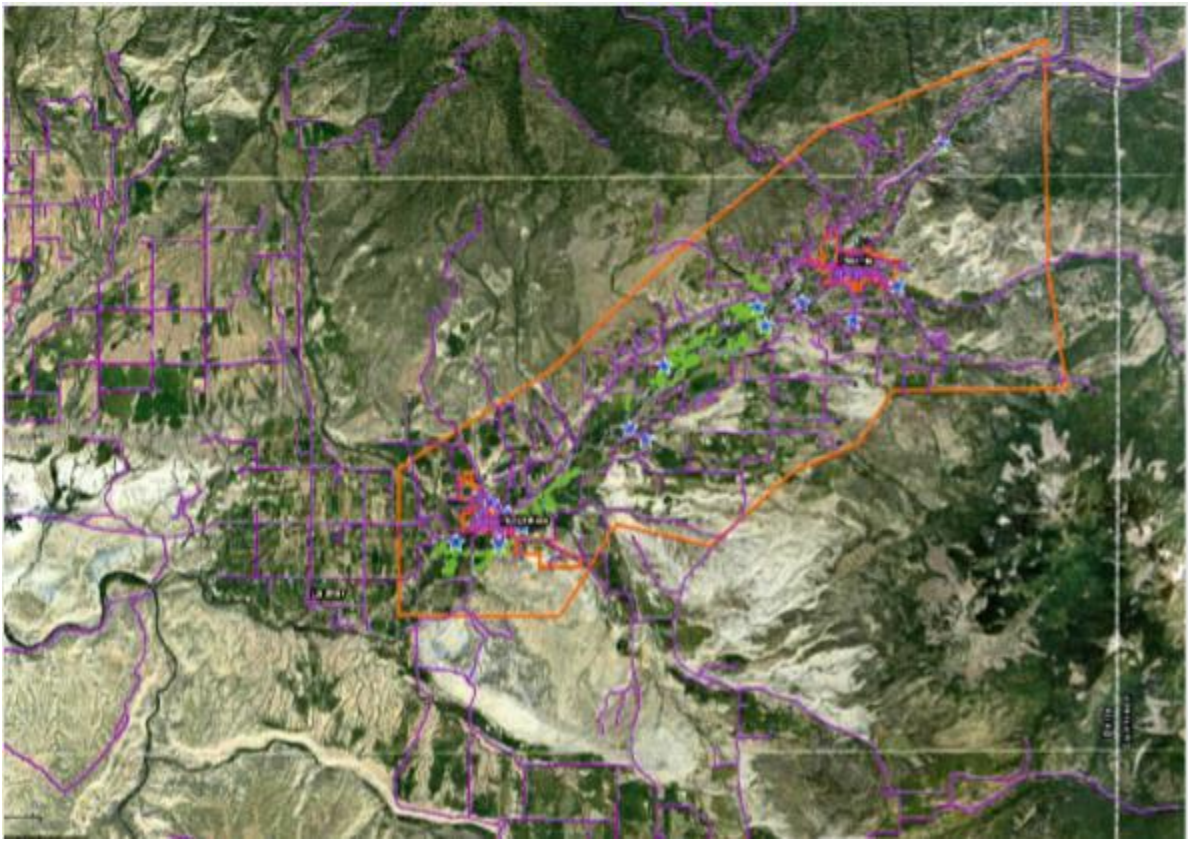
D-1, D-2, D-4: Pest Management Area: The District area is 50 square miles, in the North Eastern area of Delta County known as the North Fork Mosquito Abatement District (NFMAD).

D-3:

Maps:

Attached to Annual

Report



D-5: Operator

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

D-8: This 2019 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.

2019 was an extremely challenging season for mosquito control, given the previous 2018 drought conditions throughout the valley, combined with the areas comprising over 1/3 of Delta County that are not in a mosquito control district. NFMAD is surrounded by untreated areas, including the Crawford reservoir, Lazear, the fish hatcheries, Rogers mesa, Powell mesa, Upper Hanson Mesa, Leroux Creek, etc, mainly to the north, south, and west of the town of Hotchkiss.

In 2019, trap perimeters were set outside the District borders to determine the source of adult mosquitoes coming into the District areas. Prevailing wind directions also played a part in determination of adult mosquito pressure on the boundary areas. It is highly interesting to note that RAMP testing of NFMAD 18 weekly traps were negative throughout the entire season, while RAMP positives were recorded in trap pools from areas outside the District boundaries. Delta District #1, the second district in Delta County, had many weeks of positive PCR trap pools tested by the state.

Unfortunately, Delta County had the highest level of West Nile viral infections in humans, including 2 deaths. All cases were residents outside of the North Fork District area, residents that worked outside the District boundaries, or residents that live on the borders where NFMAD does not have a legal mandate to treat (2). This is incredibly heartbreaking and frustrating as our office voicemail receives hundreds of calls every season from residents in non-served areas desperate for help.

Despite repeated requests for the formation of 3rd and 4th mosquito control districts (Crawford, then CedarEdge/Surface Creek and other non-served areas of the Grand Mesa region), the Board of County Commissioners and the Department of Health have declined to take on the task, citing the need for "a local champion". The NFMAD board is all volunteer, and already are donating hundreds of hours each season. It is not possible to take on forming further special districts in the county!

The NFMAD board of directors has contacted the town of Crawford to offer support and education to form a district, without reply. Residents and NFMAD crew members have approached the CedarEdge town council, also without action. At this point, given our severely underfunded budget, NFMAD has instituted a subscription for service to residents in the immediate border areas, by contribution. We cannot take on the non-served areas without substantial financial grants or awards due to budgetary constraints. Otherwise, we continue to answer these resident requests by passing on the phone numbers of the BOCC and Department of Health, as well as referring to the NFMAD website where information is available on repellents, policing of personal property, and state WNV facts.

The North Fork of the Gunnison river was far higher in volume due to a wet and cold spring, dropping down suddenly in July…later than the previous 40 years. The previous 2018 drought forced the high use of domestic water sources, and alternate irrigation methods, creating many new breeding areas, which were complicated by areas of flooding throughout May and June of 2019. Previously stable sites became volatile, others dried down completely, and new sites emerged.

These wet and cold conditions 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 7 seasons has had beneficial impact on operations throughout the District, and in the 2019 season, continued to make a big difference. Many

ongoing physical mitigation projects were completed, allowing monies to be directed to border areas of the District, including the Crawford direction, and western/northern/southern Hotchkiss. NFMAD crews extended treatment outside the District boundaries attempting to stabilize the influx of adult mosquitoes.

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 2019, up to 18 traps in the District were set weekly, usually beginning in the end of May/early June, however the cold, wet weather altered the trap schedule. There were zero RAMP positives within the District. The addition of several hemp farms to the District complicated trapping and treatment, given irrigation practices. One of the main breeding areas occurred in Hotchkiss, outside the District boundaries, and the farm owner refused access. We were able to contain the issue by contacting all of the neighboring residents, setting traps and treating with the full range of barrier sprays, larval products and adulticide.

West Nile virus, (WNV) is endemic in Culex mosquito populations and this season the virus was extremely virulent in Delta County, particularly the non-served areas as well as Delta District #1.

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, or simply higher test numbers, within as little as 4 hours after test results. In 2019, the only positive tests were in areas outside the boundaries of NFMAD, yet our full response was employed, again hampered by budgetary constraints.

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 possible within the budget.

As always, the public was notified to take extra personal precautions to avoid the illness. Regular announcements were made on the Facebook NFMAD page, and the NFMAD website, along with KVNF radio spots, and public events.

Warnings about the Crawford reservoir were posted before all holidays and weekends throughout the season, given the high number of neurological cases filed with the Department of Health in this area.

The NFMAD board communicated regularly with the Department of Health Ken Nordstrom, to ascertain location of the >35 cases reported. "In the North Fork Region" was posted by the Department of Health, but it turned out to be in the non-served areas of Crawford, and boundary areas of Hotchkiss.

Being bitten outside of the District, is no comfort to those who have contracted the virus or have loved ones who have become ill, and once again, county wide mosquito control is necessary to eradicate WNV.

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 will always go hand in hand.

Trap #1 Zack's BBQ area	Aedes	Culex	Other	Total	RAMP	NOTES
6/5/20119 Rained out					N/A	
6/16/19	42	1	22	65	neg	
6/30/19 Event, trap cancelled						
7/7/19	56	68	127	251	NEG, <10	
7/14/19	84	28	112	224	Neg <10	
7/23/19	101	25	23	149	Neg <10	
8/1/19	88	18	6	112	Neg <10	
8/8/19 trap failure due to high wind						
8/11/19	21	21	9	72	Neg<10	
8/18/19 rained out						
Trap #1 Zack's BBQ area	**Aedes**	**Culex**	**Other**	**Total**	**RAMP**	**NOTES**
8/25/19	3	5	0	8	Neg <10	
9/2/19	7	4	4	15	Neg <10	

Trap # 2: Fairgrounds Primary	Aedes	Culex	Other Species	Total	RAMP	NOTES
6/5/18 Rained out						
6/16/19	62	2	19	83	Neg	
6/25/19	17	2	14	33	neg	
7/7/19	17	26	71	114	Neg, <10	
7/14/19	56	46	227	329	Neg <10	
7/23/19	55	22	24	101	Neg <10	
8/1/19	13	1	0	14	Neg	
8/8/19 Trapping delayed due to high winds						
8/11/19	62	16	15	93	Neg<10	
8/18/19 Rained out						

Trap # 2: Fairgrounds Primary	Aedes	Culex	Other Species	Total	RAMP	NOTES
8/25/19	3	0	0	3	N/A	
9/2/19	3	3	1	7	Neg<10	

Trap #3 Lorah Lane area	Aedes	Culex	Other Species	Total	RAMP	NOTES
6/5/19 Rained out						
6/16/19	17	29	4	30	NEG	
6/25/19	5	12	8	25	<10.0	
7/7/19	70	72	22	164	Neg, <10	
7/14/19	42	78	21	141	Neg<10	
7/23/19	24	33	3	60	Neg <10	
8/1/19	18	25	2	45	Neg <10	
8/5/19 (new location)	126	51	14	191	Neg <10	
8/11/19	41	50	12	103	Neg<10	
8/18/19	20	38	9	67	Neg<10	

Trap #3 Lorah Lane area	Aedes	Culex	Other Species	Total	RAMP	NOTES
8/27/19	1	1	0	2	Neg <10	
9/2/19	7	11	3	21	Neg<10	

Trap #4 Shifflet/Willow Hts area Non-Sentinel, as needed	Aedes	Culex	Other	Total	RAMP
6/16/19	2	20	4	26	neg
6/25/19	3	14	11	28	neg
7/7/19	11	60	71	143	Neg, <10
7/14/19	34	107	33	174	Neg <10
7/22/19	1	42	7	50	Neg <10
8/1/19	17	15	4	36	Neg <10
8/5/19 New location of trap	25	84	24	133	Neg<10
8/11/19	18	41	5	64	Neg<10
8/18/19	6	9	0	15	Neg<10
9/2/19	0	6	2	8	Neg <10

Hotchkiss (BK) Outside of District Border along the Western side	Aedes	Culex	Other Species	Total	RAMP
6/16/19	8	1	15	24	neg
6/25/19	6	2	16	24	neg
7/7/19	22	76	185	283	Neg, <10
7/14/19	52	62	670	784	Neg <10
8/1/19	27	14	28	69	Neg <10
8/5/19	98	49	102	249	Neg <10
8/11/19	91	25	71	197	Contaminated 1st sample: 640 Second test: <10 Third test: <10
8/18/19	29	21	28 207: Unknown insect	78 207??	Neg <10 Positive RAMP 640on new trap location, outside NFMAD
8/27/19	1	0	1	2	N/A Repeat multiple traps outside Western border of Nf District
9/2/19	3	9	3	15	Neg<10 Repeat of 8/27/19 trap locations

**Occasional by Request or for upcoming Events	Aedes	Culex	Other	Total	RAMP
6/27/19 J Road Area, private properties	6	17	7	17	NEG
6/27/19 J Road Area #2	60	1	1	62	NEG
Anonymous, Western Border July 31/19	56	124	87	267	Neg<10
Anonymous Western Border of district 8/5/19	0	2	14	16	Neg<10 Post-fogging
Northern District border, anonymous trap perimeter totals of 3 traps	Trap 1: 2	Trap 3: 64	Trap 2: 32 Trap 3:	100	Neg<10

Trap # 7: Bell Creek Rd. area	Aedes	Culex	Other Species	Total	RAMP
6/5/19 Rained Out					
6/16/19	10	5	28	46	neg
6/25/19	5	14	84	103	neg
7/7/19	106	36	94	236	Neg, <10
7/14/19	275	18	123	416	Neg<10
7/22/19	24	48	233	305	Neg <10
8/1/19	25	12	13	50	Neg <10
8/8/19 Weather-related trap failure					
8/11/19	4	14	13	31	Neg<10
8/18/19 Rained out					

Trap # 7: Bell Creek Rd. area	Aedes	Culex	Other Species	Total	RAMP
8/25/19	1	0	4	5	N/A
9/2/19	3	18	7	28	Neg <10

Trap #8 Pond Z area Southern Border outside of North Fork Boundary	Aedes	Culex	Other Species	Total	RAMP
6/16/19	8	25	6	39	NEG
6/23/19 trap failure					
7/7/19	1	175	5	181	Neg, <10
7/14/19	1	174	0	175	Neg <10
7/22/19	1	121	6	128	Neg <10
8/1/19	0	7	5	12	Neg <10
8/8/19 Trapping delayed by weather					
8/12/19	1	31	2	34	Neg<10
8/18/19	0	27	1	28	Neg<10
8/27/19	0	1	4	5	Neg<10

Trap #8 Pond Z area Southern Border outside of North Fork Boundary	Aedes	Culex	Other Species	Total	RAMP
9/2/19	0	6	1	7	Neg<10

Trap #10 German Creek, GZ areas Non-sentinel	Aedes	Culex	Other Species	Total	RAMP
6/19/19	3	1	0	4	neg
6/25/19	12	2	2	16	neg
7/2/19	19	6	18	43	Neg, <10
7/9/19	3	2	3	8	Neg
7/22/19	16	68	37	121	Neg <10
7/29/19	2	45	33	80	Neg <10
8/5/19 Trap failure or weather: all zero					
8/12/19	2	64	9	75	Neg 10.9
8/19/19	5	24	5	34	Neg <10
8/27/19 Trap Failure					

Trap #10 German Creek, GZ areas Non-sentinel	Aedes	Culex	Other Species	Total	RAMP
9/3/19	12	24	20	56	Neg<10

Trap # 11 Hadley Rd area Non-sentinel, as needed	Aedes	Culex	Other Species	Total	RAMP
6/20/19	40	1	3	43	neg
6/25/19	120	1	2	123	NEG
7/2/19	93	9	15	117	neg
7/8/19	0	2	1	3	neg
7/22/19	3	22	13	38	Neg <10
8/5/19	20	6	12	38	Neg <10
8/12/19	5	4	8	17	Neg<10
8/19/19	3	2	6	11	Neg<10
8/25/19	0	0	2	2	N/A
9/3/19	0	0	0	0	

Trap #12 R-25 Rd. Non-sentinel	Aedes	Culex	Other Species	Total	RAMP
6/19/19	0	0	1	1	N/A
7/8/19	0	1	0	1	neg
7/29/19	2	0	0	2	
8/12/19	2	5	1	8	Neg<10
8/25/19	1	0	3	4	N/A
9/3/19	0	7	0	7	Neg<10

Edit

NFMAD COG 860036

Trap # 13 Campbell Rd.	Aedes	Culex	Other Species	Total	RAMP
6/12/19 Rained Out	0	2	5	7	neg
6/19/19	0		0	2	neg
7/2/19	0	10	9	19	Neg, <10
Trap Failure or weather 7/14/19					
7/29/19	1	43	30	74	Neg <10
8/12/19	2	7	8	17	Neg<10
8/19/19	1	12	7	20	Neg <10
8/25/19	0	0	8	8	N/A
9/3/19	0	0	1	1	N/A

Trap # 14 Pumpkin Hollow Rd.	Aedes	Culex	Other Species	Total	RAMP
6/19/19 Zero caught!					
6/25/19	300	9	6	315	neg
7/2/19	38	5	15	48	Neg, <10
7/8/19	40	13	2	55	Neg, <10
7/15/19	38	34	4	76	Neg <10
7/22/19	376	103	36	514	Neg <10
7/29/19	29	34	12	75	Neg<10
8/5/19	96	60	41	197	Neg<10
8/12/19	33	30	7	70	Neg<10
8/19/19	41	120	43	204	Neg 10.9

Trap # 14 Pumpkin Hollow Rd.	Aedes	Culex	Other Species	Total	RAMP
8/25/19	12	8	22	42	Neg14.8
9/3/19	28	33	17	78	Neg<10

Trap # 15 Paonia Water Tx, East Pumpkin Hollow areas	Aedes	Culex	Other Species	Total	RAMP
6/19/19	0	3	4	7	neg
6/25/19	3	38	8	49	NEG
7/2/19	21	15	57	90	Neg, <10
7/8/19	9	6	6	21	Neg, <10
7/13/19	55	46	27	128	Neg <10
7/22/19	41	130	173	344	Neg <10
7/29/19	71	56	25	152	Neg <10
8/5/19	31	40	29	100	Neg<10
8/12/19	5	10	1	16	Neg<10
8/18/19 Trap failure					
Trap # 15 Paonia Water Tx, East Pumpkin Hollow areas	**Aedes**	**Culex**	**Other Species**	**Total**	**RAMP**
8/25/19	10	3	12	25	Neg<10
9/3/19	22	63	18	103	Neg<10
9/11/19	1	0	12	13	N/A

Trap #16 Volunteer Park	Aedes	Culex	Other Species	Total	RAMP
6/12/18 Rained Out					
6/19/19	54	0	3	57	N/A
7/2/19	146	6	12	164	Neg, <10
7/15/19	93	16	3	12	Neg <10
7/22/19	221	92	33	346	Neg <10
7/29/19	200	55	20	275	Neg <10
8/5/19 Trapping delayed due to weather					
8/12/19	3	2	0	5	Neg<10
8/19/19 Trap Failure					
8/25/19	0	0	17	17	N/A

Trap #16 Volunteer Park	Aedes	Culex	Other Species	Total	RAMP
9/3/10	30	7	5	42	Contaminated sample data
9/11/19	0	1	0	1	Neg<10

Edit

Trap # 17 Lund Rd area	Aedes	Culex	Other Species	Total	RAMP	NOTES
6/12/19	71	5	15	91	neg	
6/25/19	83	10	59	152	neg	
7/2/19	Estimated 929	4	290?	estimated 1279	neg	Trap had been moved to a suspected breeding ground, as part of a trap perimeter
7/8/19	281	36	109	426	neg	
7/15/19	542	145	63	750	Neg<10	
7/22/19	784	178	283	1245	Neg <10	Trap moved again to the suspected breeding ground, other direction
7/29/19	930	104	217	1251	Neg <10	Multiple trap perimeter averaged
8/5/19	151	4	9	164	Neg <10	
8/12/19	129	15	11	155	Neg<10	
8/19/19	73	47	46	166	Neg<10	

Trap # 17 Lund Rd area	Aedes	Culex	Other Species	Total	RAMP	N
8/25/19	23	5	17	45	Neg<10	
9/3/19	37	39	34	110	Neg<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 2019

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.

2019 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 2018 have been compiled and analyzed for each grid map of the District in preparation for the 2019 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 in the past 6 seasons 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. In 2019, NFMAD integrated a computer software program, FieldSeeker, based on the ARC GIS ESRI platform. 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. The crew members document all treatments on IPad technology, which uploads to the base computer at the NFMAD office. FieldSeeker is revolutionizing operations for this severely underfunded District.

****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, although this function has not been utilized to date.

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.

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 2018, 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 and 2019 promised funds did not materialize, but literally all 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, as well as Tabor 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 continues to be compiled at the end of each season. In the 2019 season many of the burn sites had been permanently mitigated. The few controlled burns necessary, which usually take place in February to April, depending on weather, were delayed over and over by the cold and wet spring. Most of the sites had to be mechanically managed, followed by a smaller burn.

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 85%. In early 2019, the Homeowners Association president took over the last portion of the project, completing the drainage needs by June. The HOA also took over all financial responsibilities, greatly lightening the burden on NFMAD.

By October 2019, all physical mitigation projects were completed. Unfortunately, NFMAD does not have the legal purview or financial grants to alter the Pumpkin Hollow region, or the Union Pacific railroad tracks. These areas will require the cooperation between the

Army Corp of Engineers, the Union Pacific railroad, the County local government, and other private concerns.

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.

In 2019, both the Board of Directors and the Operations Manager did radio interviews, newspaper interviews, and spoke at the local libraries, rotary clubs, etc. in an effort to create widespread awareness of the dangers of mosquito-borne illness.

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 2019, the first larvae were observed on Burgess Lane in Paonia, due to an absentee owner creating a "lake" of shallow water in mid-April. After site evaluation, product was dispensed, appropriate to the water temperature, and the owners contacted. Larval presence began to show in late May, again due to temperatures lower than

normal.
The last adulticide spraying was late September in Paonia, and early October 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 2019, the following amounts of product were applied in the District:
Altosid: 451 briquettes
Altosid granules: 640 pounds
Aquabac: 680 pounds
BVA oil: 72 gallons
Mavrik perimeter: 2 gallons
Terminix (attractant bait, garlic sugar, no EPA #): 6 gallons

Pursuit ULV-4-4: 103 gallons
Spheratax: 720 pounds
Zenivex: 4.2 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 2019. 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 2019 respectfully submitted by Rain Klepper, President, Board of NFMAD Directors 1/23/2020

Signatures are present on cover page.