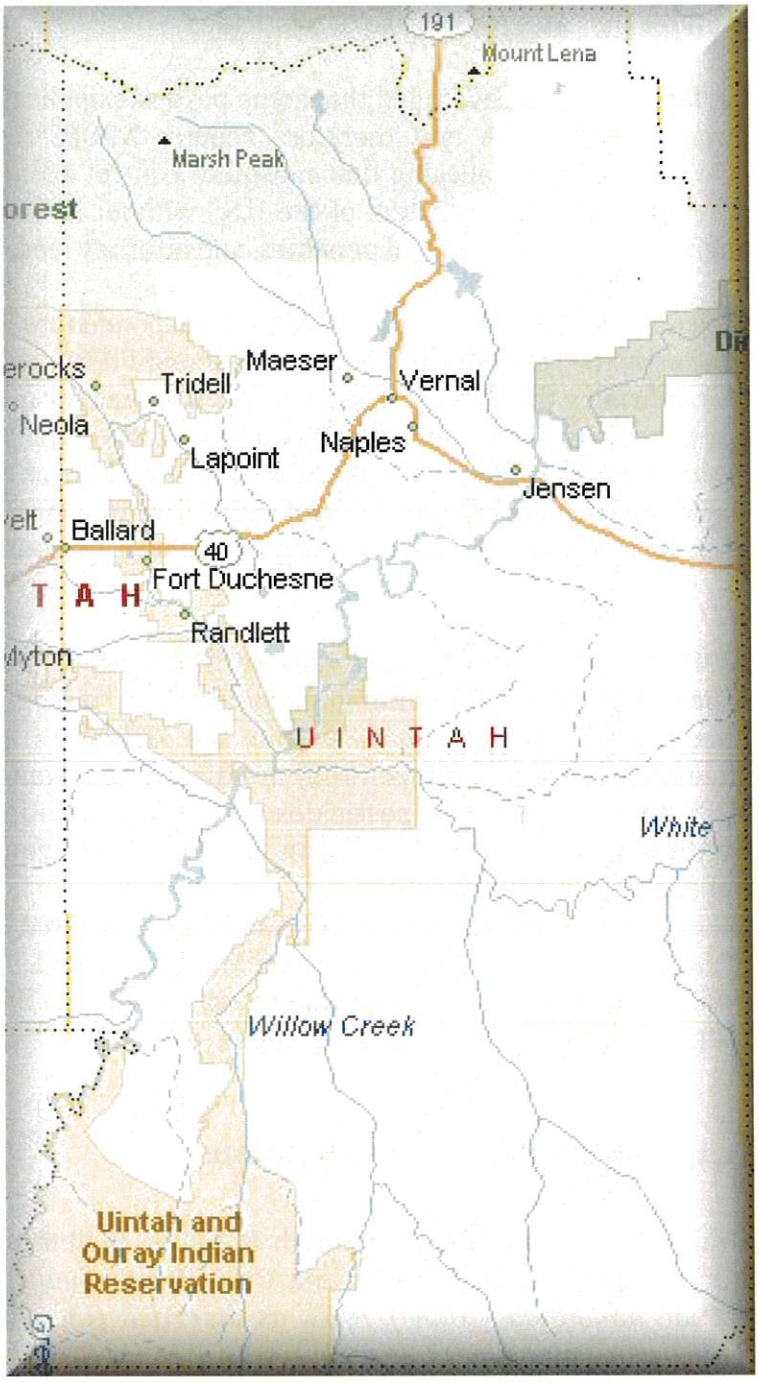
Uintah Mosquito Abatement District (Uintah MAD)
Pesticide Discharge Management Plan (PDMP)

1425 East 1000 South Vernal, Utah 84078

435-789-4105

Revised 4/3/26



Introduction

Background

EPA regulates pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and has never required National Pollutant Discharge Elimination System (NPDES) permits under the CWA for the use of pesticides.

Beginning in 2001, federal courts have ruled that some pesticide applications constitute "pollutant discharges" under CWA and therefore require NPDES permits. These decisions led to CWA citizen suits alleging that mosquito control agencies violate the CWA by discharging pesticides into "waters of the U.S." without NPDES permits. The plaintiffs have sought injunctions, large civil penalties, and attorney fees.

The American Mosquito Control Association (AMCA) responded to these suits by petitioning EPA to clarify the relationship between CWA and FIFRA, and EPA issued a Final Rule in 2006 reaffirming that the use of pesticides registered for mosquito control and for some other aquatic uses does not constitute a "pollutant discharge" under CWA if the FIFRA labels are followed. This is a reasonable interpretation, as these materials are already evaluated and regulated under FIFRA for this type of beneficial use. EPA's Final Rule has been an effective defense for mosquito control programs facing CWA lawsuits.

On January 9, 2009, the Sixth Circuit Court vacated EPA's 2006 NPDES Pesticides Rule. The Court held that the CWA unambiguously includes "biological pesticides" and "chemical pesticides" with residuals within the definition of "pollutant". Chemical pesticide residues are pollutants if they are discharged from a point source requiring an NPDES permit. Biological pesticides are always considered pollutants regardless of whether the application results in residuals and require an NPDES permit for all discharges from a point source.
The EPA subsequently requested a two-year stay, which was granted by the court. A second stay until October 31, 2011 was granted on March 28, 2011. After this date, NPDES permits will be required for discharges to waters of the US, of biological pesticides, including chemical pesticides that cause over spray which lands on water.

Documents to support Eligibility Considerations

The Uintah Mosquito Abatement District (Uintah MAD) is eligible to apply FIFRA labeled pesticides to waters of Utah under the *Utah Water Quality Act, Title 19, Chapter 5, Utah Code Annotated ("UCA") 1953, as amended (the "ACT"), Pesticide General Permit (PDG) For Point Source Discharges To Waters Of The State Of Utah From The Application Of Pesticides,* permit No. UTG17000. The permit covers any qualified "operator" that meets the eligibility requirements identified in Part I.C.1 and

part I.D.1, and if so required, submits a Notice of Intent (NOI) in accordance with Part I.A.3.

As a mosquito abatement district (activity covered in Part I.C.1.a. Mosquito and Other Insect Pests), the Uintah Mosquito Abatement District (Uintah MAD) is eligible for coverage under the PGP. Also, as an "Operator Group 2" (I.D.1.b.), Uintah MAD is required to submit a NOI regardless of the area to be treated.

The PGP requires any "operator" that is required to submit an NOI and comply with the water quality-based effluent limitations to also develop a written Pesticide Discharge Plan (PDMP) to document measures taken to meet the effluent limits. Waterways in Uintah County are not impaired with any pesticides used by the Uintah Mosquito Abatement District.

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All persons may be contacted at:

Uintah Mosquito Abatement District
1425 East 1000 South
Vernal, Utah, 84078
Tel: (435)789-4105
Fax: (435)789-1891

1. Pesticide Discharge Management Team.

All persons listed below may be contacted at the above address and listed telephone number.

A. Persons responsible for managing pests:
Danny Rasmussen – Director
Trevor Weeks – Assistant Director

B. Persons responsible for developing and revising the PDMP
Danny Rasmussen – Director

C. Persons responsible for developing, revising, and implementing corrective actions and other effluent limitation requirements
Danny Rasmussen – Director
Trevor Weeks – Assistant Director

D. Persons responsible for overseeing pesticide applications. Employees are licensed by the State of Utah, Department of Agriculture and Food as a non-commercial pesticide applicator

- Danny Rasmussen – Director
  - Pesticide Applicators License # 4002-19510
- Trevor Weeks – Assistant Director
  - Pesticide Applicators License # 4002-30324
    - Category's Include: Non-Commercial Pesticide Applicator, Aquatic Pest Control: Surface Water, Public Health Pest Control: Non-Commercial, and Aerial Application Pest Control.
  - Remote Pilot Certificate (Drone Pilot)
    - Certificate Number #5132343
    - Small Unmanned Aircraft System

- Contract Aerial Spray Applicator – Vector Disease Control International (VDCI).
- Seasonal Field Technicians
    - Seasonal Field Technicians and Seasonal Drone Pilots change from year to year and throughout the season. A list of individuals filling these seasonal positions and their license numbers can be obtained from the Uintah MAD office administrative employees.

2. Mosquito Abatement Management Area Description

The Uintah Mosquito Abatement District was created in 1975 and covers all of Uintah County with the exception of the Uintah and Ouray Indian Reservation. The District also includes the three incorporated cities of Vernal, Naples and Ballard. The boundaries of Uintah County are the Colorado state line to the east, Daggett County line to the north, Duchesne County and Emery County lines to the west, and Grande County line to the south.

Pest problem areas can be separated into 2 broad types within our service area that can be further divided into more specific groups based on habitat type.

A. Urban Habitats

Most urban areas are found in Vernal, Naples and Ballard.

1. Storm drains and catch basins are found in the more developed areas of the district, and provide a pristine environment for *Culex tarsalis*, and Culex pipiens, the primary West Nile Virus vectors. Other man-made sites include retention and detention ponds that can at times produce mosquitoes.

2. Swimming pools and water features in yards can be a producer of Culex Tarsalis, and Culex pipiens mosquitoes. If these are allowed to become unmaintained and dirty, mosquito production can be impressive. Many times, water features such as ornamental ponds, fountains, bird baths will produce mosquitoes if there isn't much movement of the water or they are not drained and cleaned often.

3. Containers come in all sorts of shapes and sizes. These may be represented by something as small as a soup can. Examples of common containers are tires, buckets, cans, wheel barrows, uncovered boats, covered boats with sagging covers, toys, plugged rain gutters, and flower vases. Rainwater harvesting is now legal in Utah. These storage containers are also

a possible source of mosquitoes. These sources are excellent sites for Culex tarsalis and Culex pipiens, known vector for WNV in Utah.

B. Rural Habitats:

1. Ditches and canals (including leaks and flows) are constructed to carry water from one place to another. When ditches are constructed in terrain with limited flow, they may contribute to a mosquito problem when there is not enough flow rate to push the water. When the water is flowing in these ditches and canals no mosquito larval will hatch or develop. Unmaintained ditches and canals discharge water to create pockets of mosquito pools. Many of these canals and ditches have leaks and seeps which collect in adjacent low-lying areas and make mosquito habitat.

2. Roadside ditches and borrow pits are common in many rural areas that do not have curb and cutter systems to remove storm water and waste irrigation water. Road side ditches when not built with sufficient slope or are not maintained on a regular basis often have standing water in them at various times through the mosquito season.

3. Pasture and croplands are generally irrigated in this area. Many pastures have a natural low area, ruts from vehicles or farm equipment, or areas with many hoof prints. These areas that stay wet for several days will provide habitat for mosquitoes. If water remains in these areas long enough a second generation of mosquitoes can be produces such a Culex tarsalis.

The major crops currently grown in the area are alfalfa, field grasses, and corn. Generally, croplands are well drained and do not provide a larval habitat in the actual field. However, when water is drained from the crops (tail water), there is often a low area where water stands and can produce both flood water and permanent water mosquitoes if it is there long enough.

4. River and creek floodplains in Uintah County are associated with four major freshwater river systems and the tributaries that flow into these. These floodplains are characterized by tamarisks, cottonwoods, Russian Olive, and willows. These flood plains are a major source of mosquitoes in Uintah County. Mosquito species commonly found in these environments include *Culex tarsalis, Anopheles freeborni, Aedes vexans* and a number of floodwater species of *Ochlerotatus* genus.

5. Lakes, ponds, and swells are also a source of mosquitoes in the right circumstance. Many times, around the shorelines of a lake and ponds mosquito larva can be produced if there is sufficient vegetation. As the elevation of these lakes and ponds increases mosquito production can occur. At these times we mostly see Aedes and Ochlerotatus species. These areas of lakes and ponds can also be very productive for Culex tarsalis and Anopheles

freeborni. Swales are similar in nature, but tend to be shallower, dry more often, and have vegetation throughout, as water inundates these areas, they become a mosquito production area.

6. Mudflats are low areas, much like swales, that because of the lack of drainage accumulate salts in the soil through evaporation. Mudflats contain little vegetation. Mud flats remain dry most of the time but can produce mosquitoes when they are wet. Many times, mudflats will have small amounts of salt grass which make it a good mosquito production area.

7. Other natural environments include springs, seeps, well-fed pools and depressions that may or may not be permanent. Examples of these habitats include ponds, sloughs, and depressions. Most of these are highly vegetated. These areas serve as excellent nurseries for most species of mosquitoes found in our region.

8. Watering troughs are a common container in the district and often produce Culex tarsalis mosquitoes.

3. Pest Problem Description.

There are 22 species of mosquitoes identified in the district since surveys have been conducted as of 1975. The primary nuisance mosquitoes are *Aedes dorsalis, Aedes increpitus, Aedes melanimon, Aedes nigromaculis , Aedes spencerii idahoensis, Aedes vexans, Culiseta inornata* . Our primary vectors of West Nile Virus are *Culex tarsalis and Culex pipiens. Anopheles freeborni* is also an important disease vector for Malaria. Other species may pose problems periodically.

In the discussion below *Aedes* is used for the genus of increpitus, dorsalis, nigromaculis, melanimon, spencerii idahoensis. Some literature refers to these species as being in the genus *Ochlerotatus*.

Aedes dorsalis –

Larva. Prefers shallow, intermittently flooded, alkaline pools with salt grass as the dominant vegetation. Larvae are also found in a variety of habitats including pastures and roadside ditches. The larvae are found in abundance from April through September, but generally peak in May. From June on it is found alone or is succeeded by *Cx. tarsalis*, if the water source does not dry up.

Adult. This species is readily attracted to CO_2 baited traps and its movement can be effectively monitored with CO_2 baited traps. Its main importance is as a pest that is able to fly long distances in search of blood meals and will bite during the day as well as at night times. This is usually one of the three most

commonly trapped species in the district, tied with *Aedes vexans for second place.*

Aedes increpitus –

Larva. Collections of this single brooded species are almost always made between March and May. Larvae normally appear early in the spring in overflow pools along streams and in depressions filled by rain or melting snow. A rare species in the District, however, in some years it has been locally abundant.

Adult. – A single brooded species that is found mainly in the spring and is rarely collected in the District's CO_2 baited traps. When present this species can be a troublesome biter and if not controlled will live for several weeks.

Aedes melanimon –

Larva: Closely resembles *Ae dorsalis* in all stages. Melaniman prefers fresher water for larval development than dorsalis. Has been taken in stream overflow pools as well as irrigated pastures. This species is often found along the Green River.

Adults: A multi-brooded species. Collections have been made from May until September at elevations below 7,000 feet. Because of the close resemblance to *Ae dorsalis*, it is believed that this species is more common than collections indicate.

Aedes nigromaculis –

Larva. Found almost exclusively in freshly irrigated pasturelands, usually with no other species present. Larvae can be found from June through September, but are usually most abundant in the hot summer months. During the hottest part of summer, the egg to adult development can be as short as 3½ days. Therefore, technicians should give special attention to areas known to be this species habitat. Collections of this species have been on a decline for several years. The habitat for this species traditionally has been at Kelly Powell's in Jensen and south and east of the KNEU tower in Ballard, other areas also produce them in lower numbers.

Adult. This species is not readily attracted to CO_2 baited traps. It can fly long distances in search of blood meals. When present, the females are very aggressive biters attacking throughout the day. In the years past *Ae. nigromaculis* was a much more abundant, but sprinkle irrigation has reduced the sources.

Aedes spencerii idahoensis -

Larva. Primary habitat Green River spring sub up and overflow water. Rarely found as larva away from the river. Single brooded abundant in spring and early summer in a high river year.

Adults. This species is an extremely aggressive and very persistent bitter, day and night and evokes many complaints. Capable of huge trans-desert migrations into the populated valleys. A flight range of 15 to 20 miles.

Aedes vexans –

Larva. Commonly called the "flood water" mosquito. The larvae are usually found in shaded areas of fresh water where there has been leakage or overflow from a river or canal. Larvae may also be found to lesser degrees in

freshly flooded pastures. Larvae can be found from May through September, but are most abundant from June through August. Collections of *Aedes vexans* larvae tend to be cyclical, following the flooding trends along the Green River.
Adult. *Aedes vexans* is a very aggressive mosquito biting throughout the nighttime and daytime periods. When present around people, it will solicit service requests. Collections of this species vary tremendously from year to year. This is usually one of the three most commonly trapped species in the district, tied with *Aedes dorsalis for second place.*

Culex pipiens –

Larva. Commonly found in semi-permanent bodies of stagnant water that is high in organic content. This species is known as the "northern house mosquito", since it is frequently found in association with homes, in areas such as ornamental ponds, poorly drained or clogged gutters, catch basins and artificial containers. Because of its close association to humans and its implicated role as a vector for St. Louis encephalitis and documented role as vector of West Nile Virus. Larvae are generally collected from May through September, but in the greatest numbers June through August.
Adult. This species breeds in close association with man, and adults enter buildings readily. It is not a severe biter of man, but is one of two vectors of West Nile Virus within the District.

Cu*lex tarsalis* -

Larvae prefer semi-permanent pools that have fresh to slightly alkaline waters. The larvae are found in a wide variety of large habitats including pastures, roadside ditches, and salt grass marshlands. In more rural settings such as the Uintah Basin this species is often found in small container habitats. Larvae are commonly found in water in which *Ae. dorsalis* larvae are in the latter stages of development. Larvae are usually first found in April, peak in late July through August and decline quickly in September.
Adult. The vector of Western Equine Encephalitis and West Nile Virus, this species is the most commonly collected in the District in most years. *Cx. tarsalis* feeds primarily on birds in the spring, but gradually switches to mammals in late July. Blood meals are taken between dusk and dawn. This species is not a day time biter. Because of its disease-transmitting potential and large numbers, it is a major concern for control strategies.

Culiseta inornata –

Larva. Larvae are found in a wide variety of habitats with semi-permanent water. Larvae may over-winter in mild winters. Collections of larvae normally occur from April through September, peaking in May with a second smaller peak in September. Larval populations are highest in the spring and fall and tend to decline during the warmer months.
Adult. This species takes its blood meals mainly from birds and large mammals. This is not a severe pest and not a vector of disease to man in this District. The adults are large and when biting is not as aggressive as *Aedes* species. Adults are usually found throughout the summer, but generally in much larger numbers in the cooler times of the mosquito season, May-June and September- October.

Anopheles freeborni –

Larva. Larvae prefer pools with deep semi-permanent water. This species has been uncommon in most years. *Anopheles* larvae float parallel to the water surface when breathing. Thus, they are often not recognized as mosquito larvae by inexperienced field inspectors. The low larval collection numbers do not reflect the true abundance of this species in the District.
Adult. The principal vector of malaria in the western United States. This species is not trapped in large numbers in the county. This species is a dusk to dawn biter.

4. Description of Control Measures

Overview

Integrated Mosquito Management (IMM) is a comprehensive mosquito prevention/control strategy that utilizes all available mosquito control methods singly or in combination to exploit the known vulnerabilities of mosquitoes in order to reduce their numbers to tolerable levels while maintaining a quality environment. Integrated mosquito management methods are specifically tailored to safely counter each stage of the mosquito life cycle. Larval control utilizing natural biological control methods, water sanitation practices, and water or vegetation management or other types of source reduction measures where compatible with other land management uses, are prudent mosquito management alternatives - as is use of EPA-registered larvicides and adulticides. When source elimination or larval control measures are not feasible or are clearly inadequate, or when faced with imminent mosquito-borne disease, application of adulticides by certified applicators may be needed. Adulticide products are chosen based upon their demonstrated efficacy against species targeted for control, resistance management concerns and minimization of potential environmental impact. IMM does not emphasize mosquito elimination or eradication.
IMM requires a thorough understanding of mosquitoes and their bionomics by control personnel, careful inspection and monitoring for their presence and conditions favoring their development. Uintah MAD strives to employ these IMM components to the extent possible, but resource availability may limit what any individual program can do. In Uintah MAD IMM program, all intervention measures are driven by a demonstrated need based on surveillance data and action thresholds. Applying mosquito adulticides on a pre-determined schedule absent of a documented need is not acceptable practice in the IMM program.

Introduction

Since the need for mosquito control was recognized in the early twentieth century, increased knowledge of mosquito biology has driven the formulation of a variety of methodologies designed to successfully reduce both mosquito nuisance levels and mosquito-borne disease transmission. As the technologies and knowledge base from which these methodologies

were derived have matured, they have been increasingly seen as mostly complimentary or synergistic in nature, providing optimal control as part of an overall strategy. This has ultimately evolved into a strategy termed Integrated Mosquito management (IMM). IMM has been developed to encourage a balanced usage of cultural and insecticidal methodologies impacts. IMM is knowledge-based and surveillance-driven, and when properly practiced is specifically designed to accomplish the following:

- Protect human, animal and environmental health.
- Promote a rational use of pesticides.
- Reduce environmental contamination to soil, ground water, surface water, pollinators, wildlife and endangered species.
- Utilize natural biological controls to conserve and augment other control methods.
- Use target specific pesticides to the extent possible.
- Emphasize the proper timing of applications.
- Minimize pesticide resistance problems.

Progressive Steps of IMM

Uintah MAD uses five steps, also known as the Best Management Plan (BMP), in implementing its IMM. It is Uintah MAD's goal to follow the BMP in the order listed below. It should be noted that the BMP can be affected by many factors including budgetary constraints, changing technology, availability of personnel, unusual environmental conditions, etc.

Education and Public Outreach

Employee Training. It is critical that all employees involved with mosquito control operations have a good understanding of the biology of the mosquito species that are being controlled. The Uintah MAD has an ongoing commitment to give continuing education opportunities to the employees through attendance at professional meetings, webinars, current literature, on the job training provided by the Director and Assistant Director, local workshops, etc.

Licensing. All employees that do field mosquito control work are required to obtain a Non-commercial Pesticide Applicators License from the Utah Department of Agriculture and Food (UDAF) in the public health category. The UDAF requires a score of 70% or greater on tests to receive a license. This insures a basic proficiency and knowledge in mosquito control.

All employees are encouraged as they interact with the public to educated the public on mosquito control and the various aspects of it. This interaction is important in helping the public understand the program.

If requested a resident may ask to be put on a "No Spray List" for individuals that would have informed us of any sensitivity to the products we use, enabling these individuals to avoid contact from these products all together.

Surveillance

All facets of Uintah MAD mosquito abatement operations are based on some form of surveillance. Individual types of surveillance are discussed below.

Larval: Larvae are inspected with a standard 12 oz. dipper. Dips are taken and checked for larval presence and the stage of the larvae. The exceptions to this rule are pre-treatment areas, catch basins, and the Green River corridor when aerial applications are applied. Along this corridor surveillance is conducted at historical research sites used for many years to confirm the presence of mosquito larvae. Much of the river corridor is inaccessible or very difficult to access and these sites have been found to be representative of mosquito production throughout the corridor.

Adult: Uintah MAD use CO_2 baited traps for monitoring adult mosquito populations. CO_2 traps are placed at various locations one night each week between the first of June and mid-September (some trapping may occur prior to June). Technicians' while in the field can visually monitor the number of mosquitoes per minute.

Disease: Live adult mosquitoes trapped in CO_2 baited traps are sorted by species, with *Cx tarsalis* and *Culex pipiens* placed in vials of between 10 and 100 individuals and sent to the Unified State Laboratory: Public Health for the testing of mosquito-borne viruses.

Mapping: Uintah MAD has produced maps identifying the entire known larval mosquito producing sources in the area controlled by the district. These maps are updated regularly to reflect new areas or areas that may have been eliminated or are temporally dry.

Efficacy: As time allows larval sources that are treated are re-inspected within one week to verify the success or failure of each pesticide application. When possible, it is important to do surveillance following adulticiding applications to verify that the procedures, equipment and product being used are meeting performance expectations. This can help access application rates and resistance management.

Service Requests: All calls from citizens are logged in and followed up on, generally within 24 hours.

Physical Control & Source Reduction

Source reduction (the elimination, removal or reduction of larval mosquito habitats) typically is the most effective and economical long-term method of mosquito control, but this may not be practicable for many larval habitats. Source reduction can be as simple as overturning a discarded bucket, disposing of a used tire or having an abandoned swimming pool drained. These efforts often minimize and/or eliminate the need for mosquito larviciding in the affected habitat in addition to greatly reducing the need for adulticiding in nearby areas.

Larval Control

Larval control is the primary control method when source reduction has not proven effective or practical. Sites treated with larvicides are inspected for the presence of larvae. The exceptions to this rule are pre-hatch treatment areas, catch basins, and the Green River corridor when aerial applications are applied. Along this corridor surveillance is conducted at historical research sites used for many years to confirm the presence of mosquito larvae. Much of the river corridor is inaccessible or very difficult to access and these sites have been found to be representative of mosquito production throughout the corridor.

Pre-hatch treatment areas are usually dry when treated but have a documented history of mosquito larval production. The pre-hatch treatments are made to use less pesticide and man-power. Currently the district uses the microbial larvicide Natular G30, *Sacchrapolyspora spinosa*, and various formulations of Altosid, *methoprene* in known sources; and, Altosid XR Briquets and Natular XRT Briquets in catch basins and storm drains as pre-hatch treatment larvicides.

The following table details the primary larvicides and pupicides utilized by Uintah MAD. The District reserves the right to employ equivalent products under different trade names or other EPA-registered formulations to address specific field conditions or operational needs.

Trade Name	Active Ingredient
Granular Products	
VectoBac GS	*Bacillus thuringiensis israelensis* (Bti)
VectoBac GR	*Bacillus thuringiensis israelensis* (Bti)
VectoMax FG	Bti + *Bacillus sphaericus* (Bs)
VectoBac Prime	Bti + (S)-Methoprene
Natular G30	Spinosad
Altosid P35	(S)-Methoprene
Tablets/Briquets	
Altosid Briquets	(S)-Methoprene
Natular XRT Tablet	Spinosad
Liquid Products	
Agnique (MMF)	Poly (ethylene glycol) mono (tridecyl) ether
VectoBac 12AS	*Bacillus thuringiensis israelensis* (Bti)
Coco Bear	Mineral Oil (White Mineral Oil)

Adult Control

Uintah MAD recognizes that adult mosquito control (as specifically Ultra Low Volume (ULV) adulticidal applications) is necessary when larval control has

not been effective or operationally feasible. Uintah MAD asserts that habitat management / larvicidal control is preferred over any routine public exposure to pesticides as from adult mosquito control. Uintah MAD strives to affect larval reduction via source management and/or larval abating when legally and environmentally justified.

All adulticiding treatments made by Uintah MAD are based on surveillance, never by a set schedule.

Ground adulticiding is accomplished by truck mounted ULV machines. Uintah MAD uses Kontrol 30+30 (30% permethrin and 30 % piperonyl butoxide) as the adulticide for most applications. However, Duet or Zenivex may also be used.

Aerial adulticiding is accomplished via a contract with an independent aerial application contractor. Uintah MAD provides maps to the contractor which they convert to electronic shape files. The contractor loads the electronic shape files into the GPS equipment on the aircraft and is guided to the location of the adulticiding treatment. Uintah MAD uses Dibrom (87.4% naled) and Duet for aerial adulticiding if aerial application is needed in the majority of applications.

Record Keeping

Uintah MAD uses a GPS based system for record keeping of larvicide applications and inspections. Paper reports are generated at the end of each season. Pesticide applications have applicator, application date and additionally have the inspector, inspection date, instars of larvae present. Adulticide reports are also kept on a GPS system for record keeping and paper reports with maps on the back side can be used as a backup if needed.

5. Schedule and Procedures Pertaining to Control Measures

Application Rate

All of the public health pesticides used by Uintah MAD are registered with the State of Utah and EPA, and have labeling approved by EPA. Every pesticide label has a range of application rates. Uintah MAD recognizes the legal, binding label on all control products. Application rates, directions, and environmental conditions are followed according to the label of each product.

Frequency of Applications/Action Threshold

An action threshold is a function of mosquito population monitoring and surveillance and when reached warrant the use of chemical control measures (pesticides). Action Thresholds vary for different mosquito species, location, and time during the mosquito season.

The following are thresholds that may trigger the application of larvicide treatments:

- The presence of any *Culex tarsalis, Culex pipiens or Anopheles,*
- Flood water mosquito (*Aedes or Oclerotatus*) larvae in concentrations of an average of ≥ 1 per dip using a standard 12 oz. plastic dipper. Actual treatments will be based on local demographics, mosquito species present, and other historic and current conditions,
- Catch basins are treated for mosquito larvae without prior larval inspection due to their number and difficulty of inspection.
- A limited number of known, historic larval sources may be 'pre-treated' before actual flooding because of the essence of time or difficulty of access once flooded.
- Along the Green River corridor when aerial applications of BTI will be applied, surveillance is conducted at historical research sites used for many years to confirm the presence of mosquito larvae. Much of the river corridor is inaccessible or very difficult to access and these sites have been found to be representative of mosquito production throughout the corridor. The threshold to treat will be met once these research sites have been visited and the production of mosquito larvae is obviously present. The number of larvae can vary site to site.

The following are thresholds that may trigger adult mosquito treatments at a specific location and the wide-ranging surrounding areas:

- **Established Trapping Locations**
  - ≥ 10 adult mosquitoes of any species captured in a CO_2 baited trap in a single night.
- **The detection of a mosquito-borne disease**
  - Detection of disease in trapped mosquitos.
  - Detection of disease in humans, horses, or birds after having been confirmed by proper authority.

- **Service requests by the public.**
  - If a request or requests are made to treat an area where thresholds have been reached either by trap numbers or detection of disease, adulticiding treatments will be schedule at the discretion of the district director or designee.
  - If threshold levels have not been met in the area, any of the following may validate treatment:
    - ≥ 10 adult mosquitoes of any species captured in a portable CO_2 baited trap in a single night that is set in the general area.
    - Technicians conduct a site visit during daylight hours and observe the presence of adult mosquitos in moderate numbers,

either flying or finding harborage in the surrounding vegetation.
        - Technicians conduct a site visit after sunset and observe the presence of flying mosquitos at a rate of ≥ 2 adult mosquitos per minute.
- **Special events or community functions**
    - If the public or an event organizer requests adulticiding, or if Uintah MAD staff identifies a special event or community function in an area threshold limits have been met (based on trap numbers or disease detection), the district director or designee will schedule treatments as deemed necessary.
    - If threshold levels have not been met in the area, any of the following may validate treatment:
        - ≥ 10 adult mosquitoes of any species captured in a portable CO_2 baited trap in a single night that is set in the general area.
        - Technicians conduct a site visit during daylight hours and observe the presence of adult mosquitos in moderate numbers, either flying or finding harborage in the surrounding vegetation.
        - Technicians conduct a site visit after sunset and observe the presence of flying mosquitos at a rate of ≥ 2 adult mosquitos per minute.

Aerial applications for adult mosquito populations may be declared when any of the following criteria have been met:

- Detection of disease in humans, horses, or birds after having been confirmed by proper authority.
- The indication of a Minimum Infection Rate in tested positive mosquito pools that may be an indicator of a possible virus outbreak. Note: A MIR ratio of 4 mosquitoes/1000 has been set as a standard to initiate aggressive ground adulticiding activity or emergency aerial applications.

Minimum Infection Rates (MIR) are calculated using the following formula:

$$\frac{\text{Total \# of positive pools /trap}}{\text{Total \# of mosquitoes trapped}} \times 1000 = \text{M.I.R.}\ *$$

- Extremely high populations of adult mosquitoes, ≥ 100 adult mosquitoes of any species captured in a CO_2 baited trap in a single night.

Pesticide Application Equipment

All pesticides used by Uintah MAD are applied by EPA label rates, recommendations and methods.

Some of the terms used to describe equipment may be unusual and are better defined below:

Hand application is literally the placement of a pesticide product at a target location using a hand. Typically, hand applications are made with formulations such as briquettes or water-soluble packets or by sprinkling a small amount of a granular product by hand in an extremely small source. Hand application sites are generally less than 500 square feet in size.

Grannie Bag applications are generally used for areas from a few square feet to several acres in size. A grannie bag is a canvas bag that has a strap that goes over an applicators shoulder, a zippered top for loading with pesticide, tapers to an exit of about 1 ½ inches where a metal tube is protruding. Inside the metal tube is a metal gage that can limit the flow of pesticide. The applicator slings the metal tube from side to side while walking, thus distributing the pesticide. The grannie bag is used to distribute granular materials.

A battery powered leaf blower with a retrofitted hopper used to hold granular pesticide may also be utilized in larviciding practices. Calibration is achieved by determining the swath width and the rate of speed at which the applicator is traveling. This could also be achieved by determining the flow rate, pounds/ounces applied and the square footage treated.

Maruyama backpack sprayers hold granules in a hopper. This piece of equipment is used similar to a granny bag except it has a 2-cycle engine and blows the granules out. The unit is calibrated by adjusting a lever which in turn adjusts a gate. This piece of equipment is typically used for granule pesticide formulations on larval mosquito sources that are less than 5 acres in size.

The Herd Seeder is a brand name and commonly used term to describe a piece of equipment that is mounted on some sort of motorized equipment such as an all-terrain-vehicle, is electrically powered by the motorized vehicle power source, has a hopper for holding pesticide, has a spinning blade that the pesticide drops onto and is thrown in an even distribution. The Herd Seeder is used to distribute granule formulations of pesticides in areas from a few hundred square feet up to many acres.

A pump-up hand sprayer (similar to a weed sprayer) is also used to distribute various forms of liquid pesticides.

An Arro Gun is used to apply granular products. The Arro Gun uses a gas engine to drive a blower which is used to force air through hoses and past a hopper and into another hose to spread granules over a large area. Calibration is accomplished by the size of the opening at the bottom of the hopper. This unit is usually hauled in the back of a Polaris Ranger and can also be hauled in a truck.

Unmanned Aircraft System (UAS) or "drone" is utilized for larviciding. A drone is able to make high precision application applications of both granular and liquid larvicides in areas that are hard to access via ground treatment methods. Dones leave no footprint so are therefore a preferred method of treatment in sensitive areas.

Various other equipment is used at times but only on specialized occasions when needed for special applications.

Uintah MAD uses eight London Fog 18-20 ULV adulticide machines mounted in the back of pickup truck and one Clarke Promist Dura fogger. London Fog ULV machines have gasoline engines to run the blower or compressor that forces the pesticide through a nozzle that breaks the liquid pesticide into the desired droplet spectrum. An FMI lab pump is calibrated to deliver the correct flow rate to the nozzle on the London Fog 18-20 machines. The Clarke Promist Dura is an electric ULV machine and functions is a similar way but is more quit than a gasoline driven fogger.

Aerial spray equipment is provided through independent aerial contractors. These applications may be applied through manned fixed wing aircraft or Unmanned Aircraft Systems (drones).

Equipment Maintenance

The assistant Director of Uintah MAD is also the mechanic. This individual is responsible for maintaining all equipment as per manufacturer specifications. All spray equipment is inspected, repaired or replaced as needed each fall and winter.

ULV sprayers are flow rate and droplet calibrated each spring. They are recalibrated through the year as changes are made in pesticide formulations. Calibration is checked on other equipment.

Efficacy

Larval sources that are treated are re-inspected within one week as manpower and time allow, verifying the success or failure of each pesticide application. The exception to this would be along the Green River corridor where many areas are inaccessible or very hard to access. In this corridor the historical research sites will be used to verify success and make follow up inspections. The other exception is storm drains that have been treated.

Adult control efficacy is determined from pre and post treatment trap counts and field observations. When possible, it is important to do surveillance following adulticiding applications to verify that the procedures, equipment and product being used are meeting performance expectations. This can help access application rates and resistance management. Many times, this is assessed by technicians in the field.

Assessing Environmental Conditions to Optimize Discharges

Weather can affect the pesticide application in numerous ways.

Wind

- Adult mosquitoes will fly into a light breeze (≤ 10mph) but tend to remain protected in vegetation with stronger wind. If adult mosquitoes are not flying, they will not be killed by ULV spraying.
- The small droplets used in ULV spraying stay aloft much longer in light breezes allowing more opportunity to contact the target mosquito. Higher winds can cause droplets to drift away from target area or dilute down the number of droplets in the target zone.
- Breezes can cause aerially applied liquid larvicide to drift away from the intended larval habitat.
- Surface films and oils once applied can be moved to untreated parts of a source and reduce efficacy.

Temperature

- During the hot summer months radiant heat buildup from the day may cause ULV droplets to rise above mosquito spray heights in the early evening.
- Inversions in the lower 30 feet of the atmosphere traps ULV droplets and aids in the exposure of flying mosquitoes to the pesticide.

Humidity

- Uintah County tends to have a very low relative humidity throughout most of the mosquito season. Low humidity may contribute to the evaporation of ULV spray droplets.
- High humidity tends to keep adult mosquitoes more active.

The ULV technicians take temperature and wind speed readings utilizing a hand instrument provided in all ULV pickups.

Spill Prevention Procedures

The pesticide storage building was designed with no draining sumps across the front of each room. When entering the building from any door a simple look down at the sump trench will quickly reveal any liquid leaks within the room.

All district vehicles are stored each evening in the vehicle storage building. During the active field season spray equipment is left on the

vehicles. Each morning before going out in the field a visual check is made of the vehicle and accompanying equipment for any leaks that may have taken place overnight.

All vehicles are equipped with MSDS & labels. The MSDS & labels are for the pesticide products currently used by the district as well as spill response procedures, emergency contact information.

Pesticide Spill Response

A spill is an accidental release of a pesticide. As careful as people try to be, pesticide spills can occur. The spill may be minor, involving only a dribble from a container, or it may be major, involving large amounts of pesticide.

The faster you can contain, absorb, and dispose of a spill, the less chance there is that it will cause harm. Clean up most spills immediately. Even minor dribbles or spills should be cleaned up before the end of the work day to keep unprotected persons or animals from being exposed.

Spill prevention and training are key to preventing pesticide spills. Uintah MAD's first response to pesticide spills is to keep all vehicles and application equipment properly maintained. Uintah MAD keeps a log of all vehicle and equipment maintenance.

When a pesticide spill occurs, the following response procedure is used:

- Immediately notify the District Manager or Supervisor with description of incident.
- Supervisors are trained in spill procedures and will instruct or supervise on how to proceed.
- Refer to spill management guidelines in the MSDS & label binder:
    - Control the spill situation
        - Protect yourself
        - Stop the source
        - Stay at the site
    - Contain the Spill
        - Contain the spill
        - Protect water sources
        - Absorb liquids
        - Cover dry materials
    - Clean Up the spill
        - Decontaminate the spill site
        - Neutralize the spill site
        - Decontaminate equipment

- Decontaminate yourself

You can get help from Chemtrec
(Chemical Transportation Emergency Center)
by calling 1-800-262-8200.
This number is for emergencies only.

Pesticide Monitoring Schedules and Procedure

Pesticide applications whether for larval or adult mosquitoes are based on historical records and/or surveillance data. Monitoring of post application treatments for larval mosquito is accomplished by field technicians who are assigned areas which they attempt to inspect on a weekly basis. When time permits larval sources that are treated are re-inspected within one week to verify the success or failure of each pesticide application.

Adulticide post application treatments are monitored through post-application trapping and Field Technician observations. When possible, it is important to do surveillance following adulticiding applications to verify that the procedures, equipment and product being used are meeting performance expectations.

Documentation is made of each application and contains the following:

Applicator name and license number
Date, time and area of application
Product used, amount and acres or area treated
Description of application system (hand, ATV etc)
Meteorological factors when applicable

I certify that I have reviewed and or prepared this document and that to the best of my knowledge all of the information is accurate.

4/3/26

Signature