Pesticide Discharge Management Plan
Flathead County Mosquito Control District

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Summary: This Pesticide Discharge Management Plan has been written to comply with the requirements imposed by the Sixth Circuit Court January 9, 2009 decision to vacate the Environmental Protection Agency's (EPA) 2006 National Pollutant Discharge Elimination System (NPDES) Pesticides Rule in National Cotton Council of America v. EPA, 553 F.3d 927 (6th Cir., 2009). Therefore, pesticide applications require permits under NPDES programs in all state and federal permitting programs. The Montana Department of Environmental Quality (DEQ) has issued a permit for pesticide 'discharge'. This permit imposes certain reporting requirements, which include the formulation of a pesticide discharge management plan that must be made available to the public upon request under the Freedom of Information Act.

Plan Organization (by page number)

1. Pesticide Discharge Management Team

1. a. Person responsible for managing pests:
Bruce Gunderson

1. b. Persons responsible for developing and managing PDMP:
Bruce Gunderson
Jake Rubow
Flathead City-County Board of Health

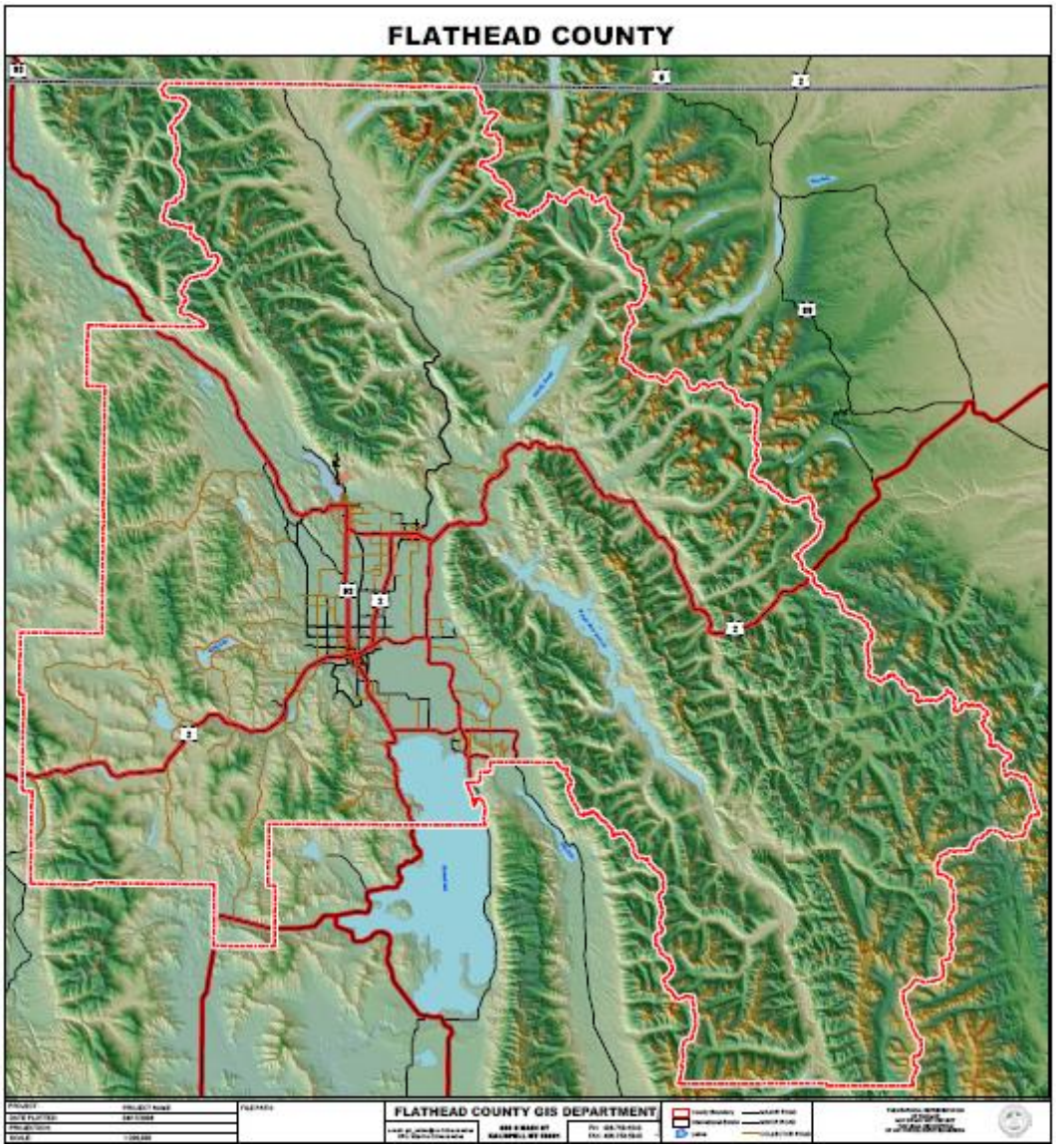
1. c. Persons responsible for developing, revising, and implementing corrective actions and other effluent limitation requirements:
Bruce Gunderson
Jake Rubow

1. d. Persons responsible for overseeing pesticide applications:
Bruce Gunderson
Jake Rubow

2. Pest Management Area Description and Habitats

2. a. Flathead River and Management Areas

The Flathead County Mosquito Control District was created August 3, 2005, by the Board of Commissioners' adoption of Resolution # 1849B. Boundaries for the District include all of Flathead County with the exception of Glacier National Park, United States Fish and Wildlife Service Waterfowl Refuges, United States Forest Service Property and private property that owners have specifically requested be excluded from control activities.



Flathead County is trisected from North to South by three primary rivers: the main stem of the Flathead River, which is affected by spring run-off from the North and Middle Forks, as well as regulated discharges from Hungry Horse Reservoir; the Whitefish River and the Stillwater River. The Swan River enters Flathead County from the South, meanders west and enters Flathead Lake at Bigfork. Smaller creeks include Ashley Creek, Trumble Creek, Patrick Creek and Spring Creek.

Spring snowmelt affects river and creek levels at different times, frequencies and rates. Localized spring rain and snowfall can raise river and stream levels quickly. Typically, high water crests in early June. As Flathead Lake nears full pool, the main stem of the Flathead River backs up to the confluence with the

Stillwater River, spilling water into low-lying areas of the lower valley. During periods of high ground water with above average snowpack, low areas throughout the valley floor experience emerging ground water from glacial kettles. High water and flooding from the valley's rivers and streams flow into backwaters and over banks, becoming trapped and creating mosquito habitat.

Manmade mosquito habitats in Flathead County include retention and detention ponds, sewage treatment facilities, tire piles, and open containers such as buckets, wheelbarrows, abandoned hot tubs and uncovered boats. Storm drains, leaking sprinkler lines and unused wading pools also produce mosquitoes.

2. b. **Pest Problem Description (target species)**

Aedes vexans, commonly referred to as a floodwater mosquito, comprises about 70% of the Districts' total mosquito population according to Montana State University trap data (2005-2017). This species has been implicated as a vector of Eastern Equine Encephalitis (EEE), West Nile Virus (WNV) and canine heartworm. Eggs from this species begin to hatch when water returns to their habitat at about 51° F. Although it has been published that eggs can lay dormant for 5-7 years, recent experience has shown this number to be much higher. Eggs are laid singly and must undergo a complete drying process before hatching.

Culex tarsalis, eggs are laid together in rafts, averaging about 190 at one time, in sunlit surface water pools that are frequently surrounded by grasses and annual vegetation. Permanent water with fixed depth rarely supports abundant populations unless intermittently disturbed. Excessive organic pollution is not tolerated. Until 2011, C*ulex tarsalis* numbers remained very low. Due to the enormous snowpack from the 2010-2011 winter, late summer numbers of *Culex tarsalis* spiked and many were collected in numerous trap locations. *Culex tarsalis* is the primary vector species for the potential transmission of WNV in Flathead County.

Culex pipiens, larvae develop in foul water in rain barrels, catch basins, faulty cesspools, ditches, and other similar habitats. Generally known as the northern house mosquito, *Culex pipiens* infest houses and bite at night. Adult females pass the winter hibernating in cellars, basements, outbuildings, caves and other places that provide protection from cold. Flight range is generally 1/2 mile or less. *Culex pipiens* are not common in Montana, but were found in the Flathead in 2008, and have established a persistent population. *Culex pipiens* is also responsible for the transmission of WNV and lays eggs in rafts of about 190 numerous times throughout the season.

Coquilletidia perturbans is a species specific to cattail marsh habitats. These mosquitoes do not frequently occur in most of Montana, but are common in the Flathead Valley. *Coquilletidia* larvae use special appendages to attach themselves to cattail stalks below the water's surface and use the hollow stalks as breathing tubes. The larvae's positions on cattail stalks protect them from water disturbances and predators that affect the swimming larvae of other species, and make them extremely difficult to find through normal larval surveillance methods. Some *Coquilletidia* larvae may even overwinter in a semi-dormant state while submerged. *Coquilletidia perturbans* can act as a vector for West Nile Virus.

These, and other, species have been identified as primary targets for control operations based on Centers for Disease Control (CDC) light trap collections, field observations and citizen complaints, which indicate high populations of these species within the District. This type of monitoring has been performed since 2006, and is the basis for determining where and when control measures will be applied. The presence of WNV is also monitored routinely, providing more information for making treatment decisions.

Focus areas for surveillance and control activities within the District are urban residential, city and county parks, recreational areas and rural residential upon request. Outreach and education about habitat

reduction and bite prevention are also important focus areas, particularly for rural residents affected by large areas surrounding their properties.

3. Control Measures to Minimize Discharges

3. a. Pest Problem and Impacts

West Nile Virus, first introduced into the United States in 1999, is present in certain bird species and has been transmitted to humans and horses in the Flathead Valley. The primary vector species that can transmit the virus infest permanent or semi-permanent bodies of clean water in grassy areas (*Culex tarsalis)*, or may infest polluted waters such as brackish rain barrels, storm drains, and failed septic cesspools (*Culex pipiens).* Nuisance mosquitoes infest areas along rivers, parks and some residential areas in towns. Potential health threats, quality of life issues, and potential economic impacts are a few of the reasons for implementing mosquito control in Flathead County.

3. b. Tolerance levels to trigger pesticide application

Flathead County Mosquito Control field technicians respond to complaint calls by visiting the property in question. If flying mosquitoes are present, the source of the breeding activity (water body) will be investigated. Surveillance data collected from suspected sites include GPS location, water body size (acres), larval dip counts, larval development stages, pupal/dip counts, trap counts (from flying adults present on site) and pertinent comments.

3. c. Aerial Operations

Aerial application is a well-established and widely utilized practice in mosquito control due to the efficacy and efficiency of such treatments. Conventional aircraft are well suited to treating large, continuous areas, but are less suited to many of the treatment areas within the Flathead County Mosquito Control District. Remotely Piloted Aircraft (RPAs) represent versatile technologies that allow Flathead County Mosquito Control to incorporate the benefits of aerial operations in a cost-effective manner better suited to our treatment areas.

The Flathead County Mosquito Control District currently operates an RPA for the purposes of monitoring flooding, examining the condition of known mosquito production sites, and locating production sites in areas of mosquito activity. The district plans to incorporate an additional RPA into the treatment program in the future. RPA treatments will be applied with properly calibrated equipment, and in full compliance with all federal and state regulations, as well as product label rates and restrictions. Such treatments will be restricted to the application of larvicides and pupicides, with adulticide applications made via ground-based equipment. A staff RPA pilot licensed through the Federal Aviation Administration (FAA) conducts all flights, all aircraft are registered with the FAA, and all operations comply with FAA and airspace requirements. No flights or treatment applications shall be made to or over private property without landowner permission. Any and all RPA use must be consistent with this provision, but may not extend to monitoring or surveillance in any other manner, including but not limited to, law enforcement use, personal surveillance, or any other form of data/information collection inconsistent with this provision or the goals of the Pesticide Discharge Management Plan.

3. d. General Statement

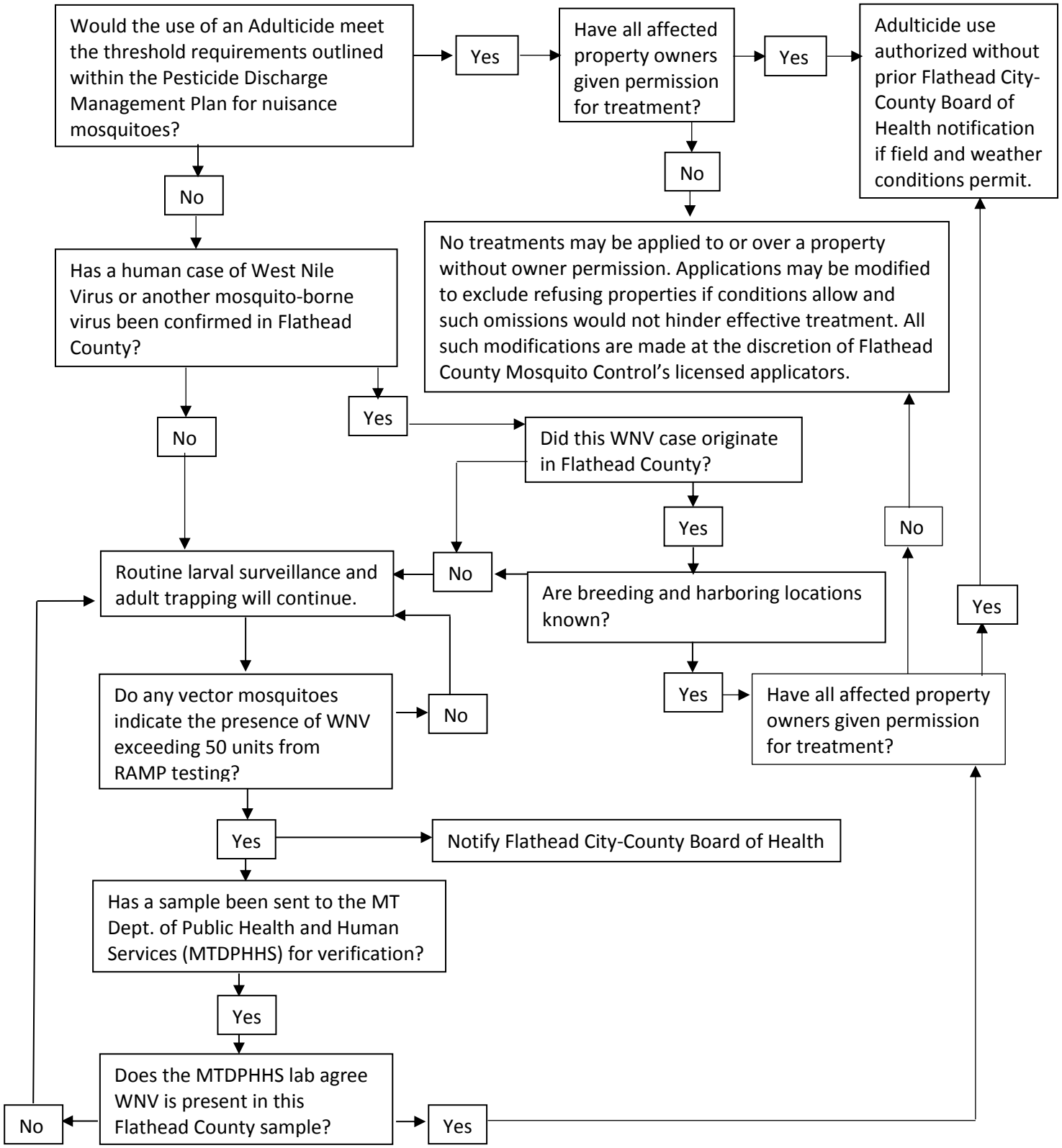
Flathead County Mosquito Control follows the common practices as described in Best Management Practices for Integrated Mosquito Management: A Focused Update (American Mosquito Control Association, January 2017). General information on control and surveillance, and the definitions used in the table below can be found in this document or in the most recent version of the Montana Mosquito Control Training Manual, published by the Montana Department of Agriculture.

Control Practices and Treatment Thresholds

Control Measure	Description	Applicability	Active Ingredient/ Formulation	Surveillance Method	Threshold	Application Method	Rate Determination
Source Reduction	Container control	Residential areas	N/A	Property checks, public education	Presence of water holding containers	N/A, Draining production sources	N/A
Larviciding	Use of EPA approved Larvicides	Backwaters, ditches, retention and detention ponds, emerging groundwater in fields and pastures	*Bacillus thuringiensis* S-Methoprene, *Bacillus sphaericus*, Spinosad (used in storm drains) Mineral Oil	Larval dipping	Presence of target species	Application with calibrated backpack or vehicle-mounted equipment	Lowest possible rate within label limits, with highest rate being used only when thick vegetation and organic material are present
Pupiciding	Use of EPA approved Pupicides	Backwaters, ditches, retention and detention ponds, emerging groundwater in fields and pastures	Mineral Oil	Pupal dipping	Presence of target species	Application with calibrated backpack or vehicle-mounted equipment	Lowest possible rate within label limits, with highest rate being used only when thick vegetation and organic material are present
Adulticiding (nuisance mosquitoes)	Use of EPA approved Adulticides	Used in urban and rural residential areas	Permethrin	CDC light trap	Trap Count of 150 adults per night. When weather or other conditions prevent treatment within ten days of a count, a new count will be completed to ensure that current mosquito levels warrant treatment.	Ground application w/calibrated vehicle-mounted or hand-carried Ultra Low Volume (ULV) equipment	Per product label and calibration
Adulticiding (vector mosquitoes)	Use of EPA approved Adulticides	Same as nuisance mosquitoes (above)	Same as nuisance mosquitoes(above)	CDC light trap, and RAMP testing for the presence of West Nile Virus. Positive RAMP results will be verified through PCR testing by the Montana Department of Public Health and Human Services.	Refer to Adulticide flowchart (following page)	Same as nuisance mosquitoes (above)	Same as nuisance mosquitoes (above)

Adulticide flowchart

The chart presented below defines the conditions under which adulticide treatments may be applied, and the steps followed to determine whether such treatments are necessary.

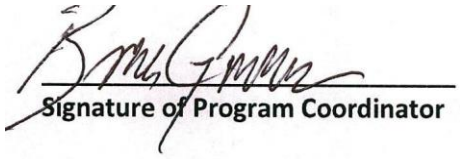


4. Schedules and Procedures

This section of the PDMP contains a list of the procedures used to implement the control measures described in Section 3 above and the schedules by which these procedures are performed. Mosquito control personnel will not access, inspect, or apply treatments to or over private property without the property owner's permission. This includes aerial inspection or treatment performed using a Remote Piloted Aircraft. If potential exists for treatment drift over neighboring properties, access and treatment permission will also be secured from all property owners who may be affected. Property owners who wish to be excluded from mosquito control activities may opt-out of treatments on the Flathead City-County Health Department website at: https://apps.flathead.mt.gov/donotspray/add.php , or by calling Flathead County Mosquito Control at (406) 751-8145 or (406) 751-8140. No applications will be made under unfavorable site or weather conditions likely to cause undesired drift or expose people to a potential treatment. All treatments are applied at the discretion of Flathead County Mosquito Control's licensed applicators and operators.

Control Method	Determination of Application Rate	Surveillance Method	Determination of Frequency of Application	Spill Prevention Procedures and Schedule	Application Equipment Calibration Schedule	Application Equipment Maintenance Schedule	Environmental Condition Assessment Procedure
Source Reduction	N/A	Dipping	N/A	N/A	N/A	N/A	Property owner/manager consulted
Larvicide	Lowest effective label rate. The presence of thick vegetation or heavy organic material in the water may necessitate use of the highest allowable rates.	Dipping/larval counts	Applications made when thresholds are exceeded and previous treatment is no longer effective.	Daily pre-trip inspections of equipment, mandatory chemical application training includes spill procedures.	Flow rate calibrated to employee and product at start of season. GPS utilized to monitor MPH travel rates on wheeled applicators.	Daily pre-trip inspections of equipment for leaks, cracks and operation. Pre-season inspections and repairs as required. Down equipment board denotes required repairs.	Onsite weather evaluations by trained applicators and operators. No applications made if wind is excessive. No application of mineral oil to areas of potential discharge into the Whitefish River.
Pupicide	Same as Larvicides	Dipping/pupal counts	Same as Larvicides	Same as Larvicides	Same as Larvicides	Same as Larvicides	Same as Larvicides, with the exception of areas of potential discharge into the Whitefish River where the application of oils is prohibited.
Adulticide	Calibrated rate does not exceed label application limits,	CDC Light Trap counts	Applications made when thresholds are exceeded, and in accordance with label limitations. All applications will be made at the discretion of Flathead County Mosquito Control's licensed applicators.	Daily pre-trip inspections of equipment, spill kits on vehicles mandatory chemical application training includes spill procedures.	Pre-season certified calibration and subsequent use/acre evaluations.	Daily pre-trip inspections of equipment for leaks, cracks and operation. Pre-season inspections and repairs as required. Equipment log denotes required maintenance and repairs.	Public notification of an adulticide application will be posted on the mosquito control website at Flatheadhealth.org/Mosquito Control . GPI weather forecast monitored in advance. Onsite weather evaluations by trained applicators. No applications to areas with people present and without the consent of all affected stakeholders. Consideration will be given to natural pollinators. No applications if wind speed exceeds 5 mph or drift is likely to impact non-target areas. All applications will be made at the discretion of Flathead County Mosquito Control's licensed applicators.

This Pesticide Discharge Management Plan will be reviewed and updated once per calendar year, or whenever necessary to update the pest problem identified and pest management strategies evaluated for the **Flathead County Mosquito Control District.**



Signature of Program Coordinator

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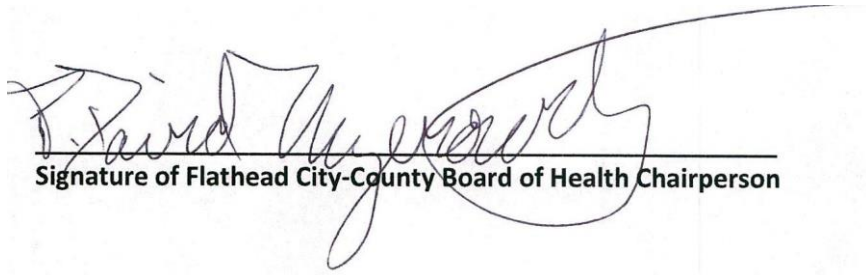

Signature of Flathead City-County Board of Health Chairperson

2/15/18

Date