



# **Gem County Mosquito Abatement District**

## **Comprehensive Mosquito Surveillance and Control Plan 2018**

**Copyright © 2018  
Gem County Mosquito Abatement District  
Not to be reprinted without permission.**

# Gem County Mosquito Abatement District Comprehensive Mosquito Surveillance and Control Plan

## TABLE OF CONTENTS

Executive Summary.....	4
Integrated Mosquito Management Policy .....	5
Authority.....	5
Administrative Activities.....	5
Field Operations .....	5
Public Education and Training for Gem County Citizens and Private Property owners.....	6
Methodology of Public Notification Prior to Spraying .....	6
West Nile Virus Surveillance .....	7
Guidelines for Submission and Testing of Possibly Infected Animals .....	7
Birds .....	7
Background .....	7
Bird Specimens .....	7
Bird Specimen Collection .....	7
Safety.....	7
Dead Bird Reporting .....	8
Disposal of Dead Birds .....	8
Horses .....	8
Qualifying Horses .....	8
West Nile Virus Symptoms in Horses .....	8
Questions to ask and Documents with Samples.....	8
Samples/Testing.....	9
West Nile Virus Prevention in Horses .....	9
Vaccination.....	9
Secure Facilities.....	9
Good Health and Husbandry Practice .....	9
Standing Water Reduction .....	9
Human Surveillance and Provider Education.....	10
Human West Nile Prevention .....	10
Reducing Mosquito Population.....	10
Avoid Mosquito Bites.....	10
Integrated Mosquito Control .....	11
Mosquito Surveillance .....	11
Mosquito Population Surveillance.....	11
Mosquito-Virus Activity Surveillance .....	11
Mosquito Development Habitat Surveillance .....	11
Timely Inspections and Evaluations .....	11
Source Reduction Projects .....	12
Larval Mosquito Control .....	12
Larvicide Applications .....	12
Larviciding Agents.....	12
Pesticide Informational Websites .....	13
Eliminating Mosquito Development Sites .....	13
Eliminating Development Habitat.....	14
Larval Mosquito Development Sites and Ways to Eliminate or Treat Them .....	14

Adult Mosquito Control .....	17
Adulticide Applications.....	17
Mosquito Fogging Applications.....	17
Adulticiding Agents .....	18
Pesticide Informational Websites .....	19
Spill Response Procedures .....	19
Natural Predators.....	20
Bats.....	20
Dragonflies.....	20
Praying Mantids .....	20
<i>Gambusia affinis</i> .....	21
Blue Gill .....	21
Purple Martins.....	21
Organic Methods of Abatement to be Implemented.....	22
Public Health Pest Control Applicators.....	22
Alternative Abatement Processes for Property Owners Who Request Limited Fogging .....	22
Procedures and Responses for Individuals Requesting Limited Fogging.....	22
Research, Evaluation, and Education .....	23
Declaration .....	24
Appendix A: GCMAD West Nile Virus Response Plan .....	25
Appendix B: GCMAD NPDES Pesticide General Permit PDMP .....	27

## **Executive Summary**

Throughout the years, Gem County has experienced the threat of outbreaks of illness, including encephalitis, a mosquito born virus. In 2000, reports from bird and mosquito surveillance data indicated that West Nile Virus (WNV) had become established throughout much of the northeastern United States. Infected birds had been identified as far north as Vermont and as far south as North Carolina, representing a threefold increase in the geographic area affected by WNV compared to 1999. From 1999 to 2005, WNV spread throughout 48 of the United States, including Idaho.

From a newsletter dated November 6, 2003, the Idaho Department of Health & Welfare reported the first confirmed human case of WNV illness acquired in Idaho. Since 2003, WNV has spread across Idaho and has been detected in almost every county in Idaho. In 2016 there were more than 1,938 human cases of WNV in the U.S., and 92 human deaths. In 2016 there were 374 equine infections nationally and 7 equine infections in Idaho in 2016. With the confirmation of 8 human cases in 2016, it is evident that WNV is permanently established in Gem County and will continue to be the primary focus of mosquito control operations for the Gem County Mosquito Abatement District (GCMAD).

The primary function of the GCMAD is to protect the public's health and safety from mosquito-borne disease. The GCMAD has analyzed surveillance and control efficacy data in order to prepare for the 2018 mosquito season. To ensure a coordinated approach for managing mosquitoes and mosquito-borne disease outbreaks in Gem County, the GCMAD has worked with the following agencies and organizations: Southwest District Health (SWDH), the Idaho State Department of Agriculture (ISDA), Idaho Department of Health and Welfare (IDHW), Idaho Department of Fish and Game (IDFG), Gem County Commissioners, Gem County Weed Control, drainage districts, and insurance companies. This work has produced the 2018 Comprehensive Mosquito Surveillance and Control Plan.

The key to GCMAD planning efforts is an emphasis on prevention. The GCMAD will devote resources to a district-wide effort to prevent mosquito infestations, while enhancing existing disease surveillance and public and medical provider education activities. The goal of the 2018 "Plan" is to prevent adult mosquito infestations and disease transmission caused by mosquitoes through aggressive source reduction and larval mosquito control. In addition, because vector trends indicate that a substantial risk may exist from WNV and other diseases transmitted to humans by mosquitoes, control, through ground and aerial applications of larval and adult mosquito control agents will be used as needed.

North American surveillance data collected in past years demonstrated WNV and other diseases can be detected in birds and mosquitoes weeks before there is a significant risk to human health. Therefore, the tracking of dead birds and the routine surveillance of mosquito populations will provide the district the opportunity to specifically target those neighborhoods and areas where mosquito-transmitted infectious diseases are likely to appear. The goal of early detection is to enhance mosquito control in high-risk areas in an attempt to interrupt the amplification of viruses and diseases before they have a significant impact on human health.

Although mosquitoes are most active in Gem County from May through September, a strong mosquito prevention, testing, and control program is a year-round activity. The 2018 Comprehensive Mosquito Surveillance and Control Plan is designed to minimize the impact of mosquitoes and mosquito-borne diseases through district-wide surveillance measures and an integrated approach to mosquito management with control practices that are commensurate with the risk posed by these diseases.

The comprehensive nature of the plan seeks to ensure the efficacy of the control measures while minimizing detrimental impacts on the environment and human health from the control measures. In keeping with this Surveillance and Control plan, the GCMAD has adopted the following Integrated Mosquito Management Policy:

# Integrated Mosquito Management Policy

The GCMAD supports management of mosquito populations when and where necessary by means of an integrated program designed to benefit or to have minimal adverse effects on people, domestic animals, wildlife, and the environment. This Integrated Mosquito Management Policy recognizes that mosquito populations cannot always be eliminated, but must be suppressed to tolerable levels for the well-being of humans, domestic animals, and wildlife, and that selection of scientifically sound suppression methods must be based upon consideration of what is ecologically and economically in the long-term best interest of constituents of the GCMAD.

The following principles are to be followed:

- Mosquito control measures should only be undertaken when there is adequate justification based on surveillance data.
- The combination of methods for mosquito control should be chosen after careful consideration of the efficacy, health effects, ecological effects, and the cost versus benefits of the various options; including public education, legal action, natural and biological control, elimination of development sources, and pesticide applications.
- Mosquito development sources, whether natural or created by human activity, should be altered in such a manner as to cause the least undesirable impact on the environment.
- Pesticide application methods should be used in the most efficient and least hazardous manner in accordance with all applicable laws, regulations, and available scientific data. The registered label requirements for the pesticide used will be followed. When choices are available among different effective pesticides, those offering the least hazard to non-target organisms should be used. Pesticides will be chosen and used in a manner that will minimize the development of resistance in mosquito populations.
- Personnel involved in mosquito control programs should be properly trained and supervised, certified in accordance with relevant laws and regulations, and kept current with improvements in management techniques through continuing education and/or training programs.

The plan includes the following components:

## **Authority**

Idaho Code Title 39, Chapter 28 of the Idaho Mosquito Abatement Act authorizes properly formed mosquito abatement districts to carry out provisions of the act. The GCMAD is a properly formed abatement district and this operational plan is within the scope of authority provided for such districts by Idaho Code. Enforcement of the Idaho Mosquito Abatement Act within the district shall be the responsibility of the GCMAD's Board of Trustees.

## **Administrative Activities**

Adequate insurance and funding has been secured by the GCMAD to run the district. Integrated pest management activities shall be coordinated with the ISDA, SWDH, IDHW, IDFG, and other interested parties and/or agencies.

## **Field Operations**

The scope of GCMAD's field operations is related to the integrated management of mosquito populations within the district. Field duties outside of the district, such as surveillance, will depend on jurisdictional authority and the district's financial ability to perform control activities.

## **Public Education and Training for Gem County Citizens and Private Property Owners**

**Objective:** To increase public awareness of mosquito development areas, mosquito-borne disease prevention, and mosquito control techniques.

Through the media, presentations to community groups, and collaboration with community boards and elected officials, the GCMAD will increase public awareness of mosquito-borne disease risks and mosquito control. General public and community-wide awareness will be closely coordinated with SWDH to take advantage of the Health District's educational and promotional budget for public awareness activities and its staff of professional health educators and public information officers. SWDH has developed a fact sheet pertaining to viruses transmitted by mosquitoes, what symptoms are, and how to prevent mosquito development areas. This fact sheet can be obtained and handed out to the general-public, community boards, schools, community-based organizations, and elected officials. In addition, information about WNV can be found on several web sites:

Gem County Mosquito Abatement District:  
<http://www.gcmad.org>

Idaho Department of Health and Welfare:  
<http://www.healthandwelfare.idaho.gov/Health/DiseaseConditions/WestNileVirus/tabid/112/Default.aspx>

Centers for Disease Control and Prevention (CDC):  
<http://www.cdc.gov/ncidod/dvbid/westnile/index.htm>.

## **Methodology of Public Notification Prior to Fogging for Mosquitoes**

If surveillance data indicates an increased risk that requires ground or aerial application of pesticides to control mosquitoes, accurate and timely information of these mosquito control activities will be provided through the district's daily phone recording. There will be advance notification of intended adult mosquito control applications, provided conditions are favorable. This will be done through the use of call lists, and by voice recording at the GCMAD office. The public can obtain information about application schedules by calling (208) 365-5628. The informational recording shall state where adult mosquito control applications will occur for that day. The message will be changed depending on the infestation levels in specific areas. In addition to obtaining information regarding areas targeted for adult mosquito control applications by telephone, the district will also post the areas targeted for adult mosquito control applications on its website, [www.gcmad.org](http://www.gcmad.org), and will update this post daily, depending on the infestation levels in specific areas.

Notification will also be available on the district website and on the voice message recording at the district office.

The GCMAD has a "Call Before Spraying List." Citizens who call the GCMAD office and request to be notified by phone calls prior to adult control applications due to health reasons shall be contacted prior to applications made in their area.

## **West Nile Virus Surveillance:**

### **Guidelines for Submission and Testing of Possibly Infected Animals:**

#### **1. Birds**

**Objective:** Utilize data from dead bird collections as means of early detection of virus activity in the District in order to minimize the spread of disease before the onset of human transmission.

#### **Background:**

Reports of dead birds and testing of a portion of those dead birds will provide information on the presence or absence of WNV in a community. As with other arboviruses, WNV is maintained in a bird-mosquito-bird cycle and transmitted to mammals, including humans and horses, by infected mosquitoes. Over 150 species of birds can become infected with WNV. Members of the family *Corvidae* (e.g., crows, ravens, jays, and magpies) and raptors (birds of prey) are most susceptible to infection, develop severe disease, and experience significant mortality rates. The high mortality and the ease of identifying these large, conspicuous birds make them good sentinel animals. Since WNV tends to affect birds earlier in the year than mammals, tracking deaths in bird populations helps detect virus activity early within a community.

Consequently, in Gem County, bird mortality will most likely indicate the presence of WNV. Birds, especially crows, will be tested for infection, as this type of surveillance allows for early prediction of mosquito-borne disease transmission.

#### **Bird Specimens:**

Appropriate bird species for submission are the American Crow, the common raven, the black-billed magpie, jay species, and raptors (birds of prey). Birds (of the types listed above) with an obvious cause of death are acceptable for submission provided the carcass is still fleshy.

#### **Bird Specimen Collection:**

For information about dead bird reporting, contact IDFG Wildlife Health Laboratory by calling 454-7646, or visit the IDFG website:

<http://fishandgame.idaho.gov/public/wildlife/?getPage=216>

#### **Safety:**

As with any dead animal, gloves should be worn and no carcass should ever be touched with bare hands. Although there is no evidence the virus can be transmitted by touching a bird carcass, special precautions should always be taken when the presence of any infectious agent is unknown. Specimens should be double-bagged in plastic as soon as possible and stored in a cool place. Carcasses can be picked up with an inverted plastic bag if gloves are not available. The carcass should then be stored at 35-40°F, and the IDFG office notified within 24 hours of collection. When there will be a delay in the inspection, such as over a weekend, the carcass should be frozen until an inspection can take place.

### **Dead Bird Reports:**

Test results will be mailed to the submitting district agency as soon as they are available. It will be the responsibility of the submitting district to contact the person originally reporting the dead bird.

The Office of Epidemiology in the IDHW is responsible for tracking reportable diseases in Idaho. A reported or suspected case of WNV will be investigated to determine the source of infection (when possible), to confirm laboratory findings, and to promote public health practices designed to reduce the possibility of human illness.

### **Disposal of Dead Birds:**

#### **At Home:**

If the bird is not to be collected for testing, double-bag in plastic bags without touching the bird and dispose of it in the trash (even though there is no evidence that people can become infected from touching a dead bird, it is prudent to always avoid touching dead animals without protection).

#### **Laboratory Tested Birds:**

Tested birds specimens will be incinerated or autoclaved.

## **2. Horses:**

### **Qualifying Horses:**

Only clinically suspicious horses will be tested. Horses exhibiting any of the symptoms listed below may be tested for WNV by ISDA. A licensed veterinarian may submit a blood sample for testing.

### **West Nile Virus Symptoms in Horses:**

Approximately 40% of infected horses may die from WNV. Infected horses may display one or more of the following symptoms:

- Lack of coordination and stumbling
- Depression, disorientation, or apprehension
- Weakness of hind limbs, falling down, or inability to rise
- Muscle twitching
- Grinding teeth
- Excessive sweating and colicky appearance
- Fever
- Hypersensitivity
- Blindness
- Convulsions
- Paralysis
- Death

### **Questions to ask and document with samples:**

1. Travel history
2. Illness onset date
3. Illness description
4. Sample type
5. Location of horse



## 6. WNV vaccination history

### **Sample Testing:**

The USDA website has information on equine sampling:

<http://www.aphis.usda.gov>

Corresponding State of Idaho website:

<http://www.agri.idaho.gov/>

To arrange for testing of suspected horse cases in, horse owners are advised to contact their local veterinarian or equine care specialist.

### **West Nile Virus Prevention Measures in Horses:**

Even though there is no real way to completely prevent horses from contracting West Nile Virus, there are some prevention measures that can be used to help prevent equine infections.

#### **Vaccination:**

In February 2003, an equine WNV vaccine was granted full licensure by the USDA. The vaccine can be obtained through a licensed veterinarian or from animal vaccine distributors. Based on laboratory studies, it is effective approximately 94% of the time. Because the vaccine is not 100% protective, some vaccinated horses may still be infected with WNV. It is important to follow vaccine instructions and booster schedules.

#### **Secure Facilities:**

Secure barn or stable facilities to eliminate bird harborage. One may install fans to disburse carbon dioxide exhaled by the horses and locate incandescent lights away from the barn area to draw mosquitoes away from animal housing areas. Most mosquitoes feed at dawn and dusk; arrange to have horses inside at these times if possible. This scheduling is especially critical because this period is when horses are most likely to be bitten and infected by mosquitoes. To minimize potential exposure to WNV infected mosquitoes, this schedule should be followed until the first killing frost.

#### **Good Health and Husbandry Practices:**

Maintain horse health by following veterinarian recommendations on nutrition, dental care, parasite control, and vaccination. Poor health and husbandry practices can lower the horse's ability to respond to an infection with WNV.

#### **Standing Water Reduction:**

Mosquitoes require standing water to reproduce. Eliminating, reducing, or treating standing water on property will help prevent mosquito populations from growing.

#### **Animal Health Issues Educational information:**

ISDA, Animal Industries, 208-332-8540

### **3. Human Surveillance and Provider Education:**

**Objective:** To accurately report possible human disease occurrence and educate health care providers about mosquito-borne diseases, especially WNV.

The IDHW communicable disease reporting and investigation process was modified to include WNV, extensive training of epidemiology staff has been conducted, and local physicians, emergency rooms, and laboratories have been alerted. WNV has been added to the list of reportable diseases.

Physicians are encouraged to submit samples for WNV testing from patients having clinical signs and symptoms. A system for detecting mosquito-borne diseases among humans includes actively monitoring for suspected cases of viral encephalitis and aseptic meningitis in hospitals and laboratories. The IDHW laboratories will test blood and cerebrospinal fluid samples submitted by health care providers for WNV and other mosquito-borne viruses. Health care providers play a critical role in the detection, prevention, and clinical management of mosquito-borne diseases. The GCMAD will continue its efforts to educate the citizens of GCMAD and their health care providers regarding diseases transmitted by mosquitoes, especially WNV, and encourage rapid reporting of suspected cases of encephalitis and other communicable diseases.

The CDC updates the human case count, by state, during WNV transmission season (updates are based on CDC timelines and a delay may exist when updating information), and data can be viewed by visiting the following website:

<http://www.cdc.gov/westnile/statsmap/preliminarymapdata/histatedate.html>

#### **Human West Nile Virus Prevention:**

##### **Reduce the Mosquito Population by Eliminating Mosquito Development Sites Around the Home (a list of examples of mosquito development sites can be found on pages 14 – 16):**

- Locate and discard old tires
- Turn over plastic wading pools
- Keep swimming pools clean and chlorinated
- Drill holes in bottoms of containers for drainage
- Reduce tall vegetation

##### **Avoid Mosquito Bites**

- Wear long-sleeved shirts, pants, and socks when outside
- Avoid spending time outdoors at dusk or dawn when mosquitoes are most active.
- Use repellents that contain DEET (N-N diethyl-methyltoluamide). Always follow directions on the label. For the safety of children 2-12 years of age, do not use a repellent containing more than 10% DEET.

Ask doctors or pediatricians about applying repellent to children under the age of two. Mosquito netting can be used to cover baby carriages.

## **Integrated Mosquito Management:**

### **Mosquito Surveillance:**

**Objective:** To sample, trap, and identify mosquito species in the District and to verify if the mosquitoes surveyed are disease vectors.

The GCMAD will conduct mosquito surveillance to determine the mosquito species present in the District and to determine if the mosquito populations are at levels warranting the use of control procedures. It is important to determine where specific mosquito species exist in a particular area of the District and it is necessary to trap and identify them. Once they are identified, the level of risk for diseases can be better understood. Some mosquitoes are only pests not capable of transmitting diseases, while others are both pests and disease vectors.

**Mosquito Population Surveillance:** The GCMAD will monitor mosquito populations by use of light traps that are operated every night from 6 p.m. to 6 a.m. The light traps will be deployed in appropriate areas and will remain in those areas for the entire season. Every morning the trap catch will be collected and mosquitoes will be sorted by species and totals will be recorded for that week. Sorting and identification (to genus and species) of trap collections will be conducted at the GCMAD facility. Results from light trapping will determine whether or not adult control efforts will be initiated.

**Mosquito-Virus Activity Surveillance:** The GCMAD will place CO<sub>2</sub>-baited traps around the District to collect biting female mosquitoes. The District will be setting these traps one or two nights per week for a 12 to 14 hour period during the months of June through October. This timeframe may vary depending on the occurrence of winter frost (when mosquito activity diminishes). The trap collections will be picked up the next day. The mosquitoes are identified under a microscope to genus and species. The mosquitoes are pooled into vials by species, date, and collection location. Pools will be tested for WNV and other viruses and results will determine if there is increased risk to the human and horse population. The data will help determine if there is virus activity in local mosquito populations and what control measures are needed in the area.

**Mosquito Development Habitat Surveillance:** One of the most effective methods of mosquito control is the reduction, modification, or elimination of mosquito development habitats. The GCMAD will monitor mosquitoes district-wide by sampling for mosquito larvae to determine the distribution, density, and species. Mapping mosquito development habitat locations helps with source reduction activities and strategically pinpoint target areas for community education efforts and/or insecticide application. Development habitats will be identified, described, mapped, and cataloged using a GPS/GIS data collection system. During the months of May through September, (or as needed), employees will check water sources and marshy fields for development habitat. By collecting this information, determination of development "hot spots" (areas with a high larval count on a regular basis) can be made.

### **Timely Inspections and Evaluations:**

Timely inspections and evaluations of larval mosquito populations in water habitats by dip-collection is a key tool for determining mosquito growth phases

and population numbers. The GCMAD will continue to identify and initiate activity to reduce the amount of mosquito development sites when feasible and within regulations. The GCMAD will reduce mosquito development sites through the identification and elimination of shallow, stagnate, standing water and by application of larval control agents to sites that cannot be emptied or drained. Through a public information campaign, the GCMAD will urge residents to reduce development sites around their homes, commercial and rural properties, and to report potential development sites. The GCMAD will collaborate with elected officials, other city, county, and local agencies, and property owners to eliminate standing water in fields, tire piles, and other containers.

#### **Source Reduction Projects:**

Through the “50/50 Drainage Incentive Plan”, the GCMAD intends to reduce and eliminate slack or standing water on private property that supports mosquito development. This program is designed to assist landowners financially in cleaning up mosquito development sources. With the cooperation of landowners, the GCMAD will locate mosquito development areas and, with a 50/50 reimbursement plan to property owners (up to \$1,000.00 GCMAD cost), drain and eliminate these areas. Landowners must send a letter of request for 50/50 cost-sharing consideration on a project, including 2 independent bids. Upon approval, landowners will be financially responsible for the project (GCMAD will reimburse the landowners half the cost up to \$1000.00).

The GCMAD will notify landowners of standing water problems on their property. Each landowner will be notified of the problem and of the “50/50 Drainage Incentive Plan.” If there is no response from the landowner, the GCMAD will enter the property to eliminate mosquitoes by treating sites with appropriate control products per Idaho Code 39-2804. Application of larvicide to sites where water cannot be eliminated, including catch basins district wide, will be conducted.

#### **Mosquito Development Sites/Larval Mosquito Control:**

**Objective:** To reduce the abundance of adult mosquitoes by eliminating mosquito development habitat or treating habitat for larval mosquitoes.

#### **Larval Mosquito Control:**

**Objective:** To reduce the adult mosquito populations by controlling mosquito abundance in the larval stage.

#### **Larval Mosquito Insecticide (Larvicide) Applications:**

Mosquito larvicide application is given a high priority since this type of control offers the most selective control for mosquitoes and is effective in reducing mosquito populations. This type of mosquito control measure requires considerable personnel, equipment, materials, surveillance, and expense. However, this type of application offers good long-term control of mosquitoes. Larvicides will be applied using aerial applicators for widespread and hard to reach areas and all-terrain vehicles (ATVs) for applications in accessible areas. All larvicide applications are mapped and recorded using the district’s GPS/GIS system.

#### **Larviciding Agents:**

***Bacillus thuringiensis israelensis (Bti)*** (e.g. Vectobac, Teknar)  
Use: Approved for most permanent and temporary bodies of water. (Flood water, pastures, standing ponds, and ditches,

water polluted with sewage, water with moderate organic content, and water with high levels of suspended solids.  
Limitations: Only works on actively feeding stages (larval instar stages one, two, and three). Does not persist well in the water column.

***Bacillus sphaericus*** (e.g. Vectolex, Fourstar, Spheratax SPH, VectoPrime)

Use: Approved for most permanent and temporary bodies of water.

Limitations: Only works well on actively feeding stages. Does not work well on all species. May persist and have residual activity in some sites.

### **Insect Growth Regulators (IGRs)**

Methoprene (e.g. Altosid briquets, Metalarv)

Use: Approved for most permanent and temporary bodies of water.

Limitations: Works best on older instars (Some populations of mosquitoes may show resistance).

Note: Methoprene insect growth regulator has no effect on mosquitoes that have reached the pupal or adult stage prior to treatment.

**Larvaciding oils** (e.g. Golden Bear, BVA 2)

Use: Ditches, dairy lagoons, floodwater. Effective against all stages, including pupae.

Limitations: Use of this product should be limited to areas that will not have run off or over flow out of treated area. Some plant damage has been observed from the use of larvacide oils (rice crops in California).

**Pyrethrins** (e.g. Pyrenone Tossits)

Use: Development sites as specified on labels, usually paired with piperonyl butoxide (PBO) as a synergist.

Limitations: Must be applied to areas with no run off or outflow, not selective, will kill other insects besides mosquitoes.

### **Pesticide Informational Websites:**

Environmental Protection Agency (EPA) website:  
<http://www.epa.gov/pesticides.htm>

ISDA pesticide application information:  
<http://www.agri.state.id.us/Categories/Pesticides/indexPesticides.php>

### **Eliminating Development Habitat:**

The elimination or modification of mosquito breeding sites, when feasible and within regulations, is the simplest, most effective, and longest lasting way to reduce the number of mosquito development habitats. Mosquitoes require standing water to reproduce. They lay their eggs in moist areas, and on standing water. The eggs hatch and larvae develop into pupae and remain in water until adults emerge and fly off. Many mosquitoes will breed in any container that holds water. Eliminating, reducing, or treating standing water helps prevent the mosquito population from growing.

## **Examples of larval mosquito development sites and ways to eliminate or treat them:**

### **Site: Watering troughs**

Scrub troughs to remove algae and replace water at least every three days.

#### **Can be treated with:**

- Bacillus thuringiensis israelensis (Bti) (e.g. Vectobac, AquaBac, Teknar, VectoPrime)
- Bacillus sphaericus (e.g. Vectolex, Fourstar, Speratax)
- Gambusia affinis (Western Mosquitofish)
- Methoprene (e.g. Altosid, Metalarv)

### **Site: Buckets and other containers**

Drain or frequently empty buckets, plastic containers, ceramic pots, and trashcans. Make sure that water drained from the buckets does not pool and is not left standing.

#### **Can be treated with:**

- Bacillus thuringiensis israelensis (Bti) (e.g. Vectobac, AquaBac, Teknar, VectoPrime)
- Bacillus sphaericus (e.g. Vectolex, Fourstar, Spheratax)
- Larvicide Oil (e.g. BVA 2)
- Methoprene (e.g. Altosid, Metalarv)
- Spinosad (e.g. Natular)

### **Site: Birdbaths**

Empty, clean, and replace water every three days or more frequently.

#### **Can be treated with:**

- Bacillus thuringiensis israelensis (Bti) (e.g. Vectobac, AquaBac, Teknar, VectoPrime)
- Bacillus sphaericus (e.g. Vectolex, Fourstar, Spheratax)
- Methoprene (e.g. Altosid, Metalarv)
- Spinosad (e.g. Natular)

### **Site: Clogged gutters and drains**

Keep gutters and drains clean; use larvicide briquettes or equivalent products if standing water cannot be eliminated.

#### **Can be treated with:**

- Bacillus thuringiensis israelensis (Bti) (e.g. Vectobac, AquaBac, Teknar, VectoPrime)
- Bacillus sphaericus (e.g. Vectolex, Fourstar, Spheratax)
- Larvicide Oil (e.g. BVA 2)
- Methoprene (e.g. Altosid, Metalarv)
- Spinosad (e.g. Natular)

### **Site: Old discarded tires**

Remove, cut, or treat all old tires – including dumps and those used to hold down tarps. If the tires cannot be removed (such as in playground equipment), drilling holes in the low points of the tire to allow water to drain.

#### **Can be treated with:**

- Bacillus thuringiensis israelensis (Bti) (e.g. Vectobac, AquaBac, Teknar, VectoPrime)
- Bacillus sphaericus (e.g. Vectolex, Fourstar, Spheratax)
- Larvicide Oil (e.g. BVA 2)
- Methoprene (e.g. Altosid, Metalarv)
- Spinosad (e.g. Natular)

**Site: Wash stalls and collection drains under wash stalls**

Use larvicide briquettes or equivalent products in collection drains if water collects and stands for more than three days.

**Can be treated with:**

- Bacillus thuringiensis israelensis (Bti) (e.g. Vectobac, AquaBac, Teknar, VectoPrime)
- Bacillus sphaericus (e.g. Vectolex, Fourstar, Spheratax)
- Larvicide Oil (e.g. BVA 2)
- Methoprene (e.g. Altosid, Metalarv)
- Spinosad (e.g. Natular)

**Site: Animals should be kept off pasture areas that are being irrigated**

Deep hoof prints may hold enough pooled water to produce mosquitoes.

**Can be treated with:**

- Bacillus thuringiensis israelensis (Bti) (e.g. Vectobac, AquaBac, Teknar, VectoPrime)
- Larvicide Oil (e.g. BVA 2)
- Methoprene (e.g. Altosid, Metalarv)
- Spinosad (e.g. Natular)

**Site: Any natural water including ponds, brooks, streams, and wetlands**

The GCMAD will make an assessment, at no charge, of these natural waters for mosquito development potential. Alternatively, one should check with the agency with jurisdiction over the waterway. This may involve state and federal agencies and some local agencies in the situation of drainage districts that follow traditional natural drainage ways.

**Can be treated with:**

- Bacillus thuringiensis israelensis (Bti) (e.g. Vectobac, AquaBac, Teknar, VectoPrime)
- Bacillus sphaericus (e.g. Vectolex, Fourstar, Spheratax)
- Methoprene (e.g. Altosid, Metalarv)
- Spinosad (e.g. Natular)

**Site: Private ponds**

Ponds must be examined for development site potential. Ponds may contain fish and therefore control methods may vary.

**Can be treated with:**

- Bacillus thuringiensis israelensis (Bti) (e.g. Vectobac, AquaBac, Teknar, VectoPrime)
- Bacillus sphaericus (e.g. Vectolex, Fourstar, Spheratax)
- Gambusia affinis (Western Mosquitofish)
- Methoprene (e.g. Altosid, Metalarv)
- Spinosad (e.g. Natular)

**Site: Drain ditches and wastewater lagoons on farms or storm drains surrounding farms**

Clean ditches to ensure free flowing water. The GCMAD will help clean ditches to restore drainage with the 50/50 cost share program. If cleaning is not an option then use larvicide briquettes or equivalent product in ditches to eliminate mosquito development.

**Can be treated with:**

- Bacillus thuringiensis israelensis (Bti) (e.g. Vectobac, AquaBac, Teknar, VectoPrime)
- Bacillus sphaericus (e.g. Vectolex, Fourstar, Spheratax)
- Methoprene (e.g. Altosid, Metalarv)
- Larvicide Oil (e.g. BVA 2)

- Spinosad (e.g. Natular)
- 

**Site: Standing pools on ground or in tarps**

Prevent water from accumulating in puddles. If this is not possible, eliminate the water by sweeping it out or otherwise removing it if it stands for longer than three days.

**Can be treated with:**

- Bacillus thuringiensis israelensis (Bti) (e.g. Vectobac, AquaBac, Teknar, VectoPrime)
- Bacillus sphaericus (e.g. Vectolex, Fourstar, Shperatax)
- Methoprene (e.g. Altosid, Metalarv)
- Larvicide Oil (e.g. BVA 2)
- Spinosad (e.g. Natular)

**Site: Over-watering in public and private areas**

Do not let irrigation sprinkler systems over-water yards or pastures. Once the ground is saturated with water, pooling and standing water will form, creating a breeding area for mosquitoes.

**Can be treated with:**

- Bacillus thuringiensis israelensis (Bti) (e.g. Vectobac, AquaBac, Teknar, VectoPrime)
- Methoprene (e.g. Altosid, Metalarv)
- Larvicide Oil (e.g. BVA 2)
- Spinosad (e.g. Natular)

**Site: Increase and/or decrease water flow rates in irrigation and drainage canals**

By decreasing water flow, water will not exceed the capacity of its banks. By increasing water flow, stagnate or standing water will not accumulate in ditches.

**Can be treated with:**

- Bacillus thuringiensis israelensis (Bti) (e.g. Vectobac, AquaBac, Teknar, VectoPrime)
- Methoprene (e.g. Altosid, Metalarv)
- Larvicide Oil (e.g. BVA 2)
- Spinosad (e.g. Natular)

**Land leveling** - If there are areas on your property that are lower than others, irrigation wastewater will accumulate and become stagnate, creating a mosquito breeding area. Leveling land will eliminate low areas. The GCMAD will help in leveling this land, with the 50/50 cost share program, if it is determined that the leveling will eliminate a permanent breeding area for mosquitoes.

**Reduce and/or eliminate vegetation** - Eliminate vegetation in slack or stagnant water, which supports mosquito development.

If water cannot be drained, then covering containers with fine netting to exclude mosquitoes, or the application of mosquito larvicides to standing water can suffice. Every residential, commercial, and rural property owner should regularly inspect their property and buildings to determine if mosquito development sources exist.

**Adult Mosquito Control:**

**Objective:** To reduce the abundance of adult mosquitoes in targeted areas through the use of ultra-low volume (ULV) insecticide applications in accordance



with label directions. The application of adult mosquito control products (adulticiding) will be mapped and recorded using the district's GPS/GIS system.

A timely and appropriate response to mosquito, bird, and human surveillance findings is the key for preventing an outbreak or further spread of human disease. The GCMAD will implement a phased response to surveillance findings that will expand education, prevention, and control activities in relation to the threat of an outbreak of mosquito-borne disease.

If mosquito surveillance indicators such as trapping results, landing rates, biting rate counts, and verifiable complaints from District constituents suggest that the level of adult mosquitoes pose a significant human discomfort or threat to health, mosquitoes will be controlled through the use of adulticides.

Habitat, weather, time of year and proximity to human populations will be considered in determining the necessity for adult mosquito control. The accuracy, quality, and efficacy of adulticide applications will be closely monitored by using the district's GPS/GIS system to ensure compliance with federal and state regulations. When the application of adulticides becomes necessary, the GCMAD will provide advance notice to the public, beekeepers, and no-spray requests.

The presence of mosquito-borne pathogens in the GCMAD will result in one or more responses or interventions by the GCMAD. These interventions may range from continuing existing surveillance to aerial application of adulticides. A standard operating procedure for mosquito-borne disease emergencies is outlined in Appendix A (pg. 24).

#### **Adult Mosquito Insecticide (Adulticide) Application:**

The ULV application of mosquito adulticides will be conducted in district areas where mosquito trapping, landing and biting rate counts, and verifiable complaints from district constituents indicate significant adult mosquito activity.

Regular ULV treatments usually commence by July 1, depending on weather and surveillance findings. The GCMAD has established a "Call before Spraying" list for those residents of the GCMAD who wish to be called prior to ULV applications in the areas where they live. All ULV treatments are restricted to property within the district's jurisdiction or within mosquito migrating distance to the district and all treatments are applied according to the insecticide's label directions. All treatment equipment is calibrated as recommended by the insecticide label directions and is certified annually.

#### **Mosquito Fogging Applications:**

The GCMAD will make adulticide applications (fogging applications) in accordance to set routes after surveillance indicates the need for adult mosquito control. Fogging will usually run 3 to 4 hours during the evening, 5 days a week, as long as conditions and funding permit.

Truck or ATV Mounted Fogger: Adulticides may be applied diluted or undiluted with suitable ULV fogging equipment. Fogging applications will not exceed the maximum a.i./acre rates. Adulticides will be applied at speeds of 5 to 20 mph with a 300 ft. swath and when wind speeds do not exceed 10 mph. To reduce oil requirement and sludge buildup in equipment, the equipment will use a suitable mineral oil or will be water-

soluble. Adulticide products are to be applied only by licensed and trained GCMAD personnel.

Aerial Application for Adult Mosquito Control: The district may utilize an aerial contractor that meets specific requirements. Contractors will be fully insured, licensed, and bonded. Aerial applications may occur after notification using the district's website and telephone message machine.

### **Adulticides:**

#### **Organophosphate (OP) compounds**

Malathion (e.g. Fyfanon)

Use: May be applied by air or ground equipment over urban areas, most crops, and wetlands when applied at label rates for public health application.

Limitations: May damage automobile paint if large droplets are produced; toxic to fish, wildlife and bees; crop residue limitations may result in pre-harvest interval for some crops.

Naled: (e.g. Dibrom, Trumpet EC)

Use: Air and ground application over crops, swamps, floodwater, residential areas.

Limitations: Same as Malathion and some cosmetic spotting of fruit may occur in dry, hot climates.

Note: Some mosquito populations may become resistant to label OP application rates if applications have been routine over several years. Alternating adulticide products to avoid resistance development is recommended.

**Pyrethrins** (natural pyrethrin products) (e.g. Pyrenone Mosquito Spray, Pyrocide)

Use: Wetlands, floodwaters, residential areas, some crops.

Limitations: Do not apply to drinking water, milking areas; may be toxic to bees, fish, and some wildlife. Shellfish, such as crawfish, display little or no tolerance to these products. Some formulations with synergists have greater limitations.

**Pyrethroids** (synthetic pyrethroid products containing resmethrin, sumithrin, or permethrin) (e.g. BioMist, Kontrol, Anvil)

Use: Many croplands, wetlands, floodwater, and residential/recreational areas.

Limitations: May be toxic to bees, fish, and some wildlife; avoid treating drinking water, or products for human consumption.

### **Pesticide Informational Websites:**

EPA website:

<http://www.epa.gov/pesticides/>

ISDA pesticide application information:

<http://www.agri.idaho.gov/>

## **Spill Response Procedures:**

Every pesticide applicator needs a plan for dealing with pesticide spills. Only by planning ahead can applicators be ready to react quickly and handle a spill properly. The time spent on preparing a plan will be extremely valuable in an emergency when seconds count.

The first step in the plan is to identify the practices that increase the risk or danger of pesticide spills. These practices can be divided into three activities: storage, mixing/handling, and transportation.

### **Storage safety tips:**

No job is really finished until the pesticides, containers, and equipment have been put away properly. District personnel will store all materials safely. While cleaning up and putting away pesticides, containers, and equipment, the donning of all the personal protective equipment is required. Consideration for wearing of gloves and other protective equipment, even if they aren't required on the label is recommended.

### **Mixing/handling safety tips:**

The mixing of pesticides is to occur in a safe place. Mixing in the field eliminates the transportation of large quantities of mixed pesticide along city and county roads. District personnel shall not mix pesticides near a wellhead, stream, or other potential water contamination source.

### **Transportation safety tips:**

When transporting pesticide containers, district personnel shall tie containers down securely, carry clean-up equipment, take the best roads, and avoid streams or rivers. When going out to apply pesticides, technicians shall check equipment thoroughly, avoid steep places, and drive with extreme caution to prevent possible spillage.

### **Spill Management:**

If a spill occurs, the following procedures to control, contain, and clean up the spill are to be followed.

#### **Control**

- Identify the source of the spill and try to stop it, preventing further spillage. For example, if a small container is leaking, place it in a larger waterproof container, if a hose has broken, turn off the pump.
- Isolate the area. Rope it off or place barriers around it. Keep people and animals at least 30 feet away from the spill. Avoid coming into contact with any pesticide or its fumes.

#### **Containment**

- Put on appropriate safety gear. At a minimum, a long-sleeved shirt, long pants, rubber or neoprene boots, and gloves should be worn while cleaning up a spill. Depending on the product, the amount spilled, and whether the spill is within an enclosed area or outdoors, respirator and goggles may be needed. Wear the level of protective gear required on the pesticide label for use during handling the pesticide.
- Stop the spread of the pesticide spill. Place containment material around the spill or build a dam of soil. It is important to prevent the pesticide from entering any body of water, including storm sewers or sanitary sewers.
- Spread absorbent material such as kitty litter, vermiculite, or commercial spill containment product over the remainder of the spill. Dry pesticides will not spread very far except during windy and/or rainy weather.
- **NEVER hose down a spill!** This only spreads the pesticide.

#### **Clean up**

- Continue to add absorbent material until all the liquid is soaked up.
- Shovel the contaminated material into a leak-proof container.

- Decontaminate the area.
  - Common household bleach is usually an effective chemical on concrete or wood surfaces. Read the pesticide label for specific decontamination directions.
  - For minor spills, apply activated charcoal to contaminated soil. For large spills, the only effective way to decontaminate soil saturated with pesticide is to remove the soil until no visible stain or odor is observed.
  - Whether these soil clean-up methods are justified depends on which pesticide was spilled and how much was spilled.

**Disposal**

- If possible, the spilled pesticide should be applied to a labeled site at or below the labeled rate.
- Contaminated soil and absorbent materials must be disposed of properly. Check pesticide label for proper disposal.

**Emergency Contact Numbers:**

- Outside emergency services (police, fire department, ambulance service): **911**
- Hospital: Valor Health: 1202 E. Locust, Emmett, ID 208-365-3561
- Facility Responsible Person: Jason Kinley Phone: 208-440-7243 or 208-365-5628
- Poison Control Center: 800-860-0602
- Regional EPA Office: 208-378-5746
- State environmental agency (Idaho Dept Health & Welfare): 208-365-3515
- OSHA area office: 208-321-2960
- County Dispatch (Non-emergency): 208-365-3521

**Natural Predators:**

The GCMAD is always looking into alternative methods of controlling mosquitoes and mosquito larvae. There has been research done on several natural predators such as bats, dragonflies, praying mantids, fish (*Gambusia affinis*), Blue Gill, purple martins and other swallow-like birds.

**Bats:**

Insectivorous bat diets consist mainly of beetles, wasps, ants, flies, stoneflies, mayflies, moths, and grasshoppers. Mosquitoes make up less than 1% of their diet. Location of bat houses should also be taken into consideration, emphasizing that bats carry rabies. Separation of bat houses from the human population is a good practice

**Dragonflies:**

Dragonflies are already established in the valley. The GCMAD will do everything feasible to ensure that they are protected in the valley.

**Praying Mantids:**

Praying mantids are already established in the valley. The GCMAD will do everything feasible to ensure mantids are protected from control applications in the valley. Praying mantids primarily feed on larger, non-flying insects that are terrestrial.

**Gambusia affinis (mosquitofish):**

Mosquitofish may be distributed and utilized in compliance with all IDFG regulations. The district may distribute mosquitofish to man-made, closed-container types of mosquito production sources as listed on page 12 -14 if feasible and available. Mosquitofish are small fish that are members of the Poeciliidae family. All members of this family, which include the guppy, bear live young. They prefer warmer waters with temperatures and can withstand low dissolved oxygen levels and a wide range of salinity. They feed on a variety of items including mosquito larvae, zooplankton, fish and amphibian eggs and will attack larger fish. In some cases, they are effective for mosquito control because they are voracious feeders but are not selective for mosquito larvae. All mosquitofish living in states west of the continental divide are introduced. Research has not provided consistent evidence that mosquitofish are effective at controlling mosquito populations, with results ranging from no control at all to excellent success. Their use in many situations is likely to result in a false sense of security in controlling mosquitoes. Mosquitofish may be somewhat effective in artificial systems that don't contain natural mosquito predators, such as storm water management facilities, farm ponds, sewage lagoons and wastewater facilities. It is in these artificial isolated, high nutrient waters, which do not contain native mosquito predator species that the greatest benefit can be found from mosquitofish. It is important that these artificial water bodies do not flow into natural systems, in order to prevent mosquitofish from escaping into adjacent waters. As with many pest control methods, there are risks associated with using mosquitofish. Native amphibian, fish, and aquatic insect populations could be severely reduced or eliminated by their introduction. This occurs through predation on and competition for food with native species. Introduction of mosquitofish could worsen a mosquito problem by eliminating natural mosquito predators. Since mosquitofish would not qualify as a common aquarium or tropical fish, an IDFG import permit is required to bring them into the state. Sources from out of state would need disease clearance and verification that they do not come from Zebra Mussel contaminated waters or from the Great Lakes region where viruses are present. Any release of fish, including mosquitofish, into waters in Idaho requires a release permit from IDFG. A single annual permit can be provided to individual government agencies and mosquito abatement districts free of charge.

**Blue Gill:**

Blue Gill is already established in Gem County ponds. This fish is proven to winter well in Idaho, and will readily feed on mosquito larvae.

**Purple Martins:**

In November of 1966, there was some interest in the valley to introduce purple martins as these birds were found to eat mosquitoes. Research was conducted about how to introduce the birds into this area. Attempts were made to introduce purple martins but establishing a migratory route through the Emmett Valley was unsuccessful. Through research, bird ornithologists discovered that purple martins and other swallow-like birds do not prefer mosquitoes and that the mosquitoes make up less than 3% of their diets.

**Note:** To date, these methods have not been cost effective. A cost of up to \$50,000.00 per method per season, increased manpower to facilitate and monitor, and the ongoing use of pesticides by the agricultural community makes this type of control prohibitive at this time.

### **Organic Methods of Abatement to be Implemented:**

The GCMAD analyzes the efficacy and expense associated with organic pesticides and other methods of controlling mosquitoes. As of 2017, very few organically certified and affordable mosquito adulticide agents existed. The GCMAD will work with the ISDA and chemical companies to try to find a certified organic adulticide that can be used in appropriate portions of Gem County.

### **Pollinator Protection Initiatives:**

The GCMAD fully understands the importance of protecting pollinators and non-target organisms from adverse effects of abatement activities for a healthy environment and productive local economy. The district abides by strict pesticide use directions (according to the pesticide label), and calibrates its equipment regularly to ensure that appropriate amounts of pesticides are used in areas identified through surveillance protocols. In addition, the district makes applications to areas specifically needing treatment (as determined by surveillance thresholds) and conducts the applications when pollinators are least active (typically after sunset).

### **Public Health Pest Control Applicators:**

The director of the GCMAD will possess a current Professional Applicator's license with certifications in Law & Safety and Public Health categories issued from the Idaho State Department of Agriculture. A copy of these licenses will be made available to the Gem County Commissioners at request. The safety of district staff is of the utmost concern to the GCMAD. The GCMAD personnel will possess applicator's licenses or will work under the supervision of the licensed applicator. Personnel will receive the required safety, pesticide handling, and application training, and will wear the required personal protective equipment (PPE) while handling and applying pesticide products. In addition, district operators will wear clothing that easily identifies them in the field and to citizens.

### **Alternative Abatement Processes for Property Owners Who Request Limited Fogging, Regardless of Their Reason:**

The GCMAD will advise individuals who request limited application of mosquito control agents on their property about techniques they can initiate that are appropriate for minimizing mosquito problems. The GCMAD will assist landowners with the "50/50 Drainage Incentive Plan" to clean up ditches and standing water problems on their property (refer to Drainage Projects).

### **Procedures and Responses for Individuals Requesting Limited Fogging:**

Individuals requesting not to be sprayed will be considered on an individual basis. Citizens making a request for limited spraying must submit, each year, a completed "Treatment Exclusion Request Form", a detailed "Mosquito Control Plan" for controlling mosquito development areas and adult mosquito populations on their property, a map indicating the location of the property and the location of the residence on the property, and nearby property owner/residents whose property borders the requested treatment exclusion zone, including those located immediately across the road from the requested zone. The "Mosquito Control Plan" shall outline, in detail, the following:

- 1) The landowner's irrigation practices (e.g. flood, pivot sprinkler, rolling sprinkler, etc.).
- 2) The landowner's method of survey to ensure mosquitoes are not developing in sources on the property or harboring on the property.
- 3) The landowner's method of abatement for sites found to be producing mosquito larvae.
  - a. To include specific details about development source mitigation;
  - b. And, if necessary, methods of control to include registered brand names and types of control agents used.

- 4) The landowner's method of abating adult mosquitoes emerging from or harboring within sites on property.
  - a. To include specific details about methods of control including registered brand names and types of control agents used.
- 5) Inspector requirements for site inspection (i.e. does inspector need clean/unused boots, dipper cup, etc. to enter property).

Each request must be submitted to the GCMAD before each spraying season (within 30 days after receiving a registered reminder letter from the GCMAD). This "Letter of Request", must include any certifications or documentation supporting the request. After reviewing the request and discussing it at the next regular public meeting, the GCMAD Board will issue a letter of response. In that response letter the Board will convey the following restrictions: the landowners requesting limited spraying must be able to control all aspects of mosquito problems on their property. The GCMAD will not supply these individuals with any chemicals.

The GCMAD must be able to enter upon that property to check, monitor, and document this control on a regular basis. If the "Mosquito Control Plan" set forth by the landowner is not being implemented or adult or larval mosquito populations become a concern, the GCMAD will issue a certified letter of non-compliance. The landowner has five (5) days, after receiving the certified letter, to notify the GCMAD, in writing, that they are aware of the mosquito problem. The landowner then has another five (5) days to correct the problem. The GCMAD will then enter onto the property to check, monitor, and document the progress. If the landowner does not correct the problem area or if the landowner cannot show a good cause for an extension of time, the GCMAD will take necessary measures to correct the problem using any and all methods that are effective (Idaho Code 39-2804 (f)). The GCMAD will provide to the Gem County Commissioners copies of correspondence and documentation between the individuals requesting not to be sprayed and the District on a monthly basis.

Property owners will be responsible for all drainage water, ditches, ponds, and other mosquito breeding areas and for controlling water from backing up or flowing on to adjacent properties. If water is not being controlled, the GCMAD will issue a certified letter of non-compliance of mosquito control. The landowner has five (5) days to notify the GCMAD, in writing, that they are aware of the water problem. The landowner then has another five (5) days to correct the problem. The GCMAD will again check, monitor, and document the problem area for compliance. If the problem is not corrected by the landowner, or if the landowner cannot show a good cause for non-compliance, the GCMAD will take all measures to correct the problem using any and all methods that are effective (Idaho Code 39-2804 (f)).

Property owners should understand that in the event of a mosquito-borne disease outbreak (WNV, Western Equine Encephalitis, etc.) treatments to control the spread of disease in the mosquito population become imperative. Therefore, depending on the level of disease activity, approved treatment exclusion zones may be rescinded during a mosquito-borne disease outbreak.

#### **Research, Evaluation, and Education:**

Depending on the availability of funds, the GCMAD will conduct research to better understand where mosquito development occurs in the district and how WNV and other mosquito-borne viruses are maintained in the environment. Funds for these activities may be obtained through grant programs. The GCMAD staff (manager and employees) will attend informational seminars and training classes. Attending informational seminars and training classes is the best way to keep staff up-to-date on current technology and proper control procedures. Furthermore, the GCMAD will continue to evaluate bird and mosquito surveillance techniques that signal a threat to human health and will assess the efficacy of larval and adult mosquito control methods and products.

**Declaration**

I, the under signed, have read and approve the attached Gem County Mosquito Abatement District's "Comprehensive Mosquito Surveillance and Control Plan" for the 2018 mosquito control season.

Gem County Mosquito Abatement  
District Board Members:

Gem County Commissioners:

\_\_\_\_\_  
Michele Chadwick

\_\_\_\_\_  
Bill Butticci, Chair

\_\_\_\_\_  
Tom Carlsen

\_\_\_\_\_  
Mark Rekow

\_\_\_\_\_  
Kim Zemaitis

\_\_\_\_\_  
Bryan Elliott

\_\_\_\_\_  
Bonnie Diedrich

\_\_\_\_\_  
Anita Taylor



## **Appendix A.**

### **WEST NILE VIRUS RESPONSE PLAN**

All communities should prepare for WNV activity. There is evidence of WNV presence and the risk of human disease and outbreaks in most counties in the contiguous 48 states. The development of a useful phased response depends upon the existence of some form of WNV monitoring in the district to provide the information needed to gauge risk levels. Measures of the intensity of WNV transmission in a region, preferably from environmental surveillance indicators, should be considered when determining the level of the public health response. Human case reports lag weeks behind human infection events and are poor indicators of current risk levels. Effective public health actions depend on interpreting the best available surveillance data and initiating prompt and aggressive intervention when necessary.

The objective of a phased response to WNV surveillance data is to implement public health interventions appropriate to the level of WNV risk in a community (Table 1). The district surveillance program and environmental surveillance indicators described below demonstrate that WNV transmission can be detected several weeks before the onset of human disease, allowing for implementation of effective interventions.

#### **Alliance establishment:**

Agencies and authorities to involve:

1. Gem County Commissioners
2. Southwest District Health
3. Idaho Department of Health and Welfare, Office of Epidemiology
4. Idaho State Department of Agriculture
5. Idaho State Department of Fish and Game
6. Idaho State Department of Environmental Quality
7. Idaho Counties Risk Management Program
8. Idaho Mosquito and Vector Control Association
9. Centers for Disease Control, Vector-Borne Diseases Division
10. American Mosquito Control Association
11. Any Beekeepers Association
12. Any Local Media Contacts
13. Any agency that had previous WNV outbreak and responded to it.

**Gem County Mosquito Abatement District WNV Response Matrix (Table 1):**

Risk Category	Probability of human outbreak	Definition	Recommended activities and responses
0	None	<ul style="list-style-type: none"> <li>No adult mosquito biting activity vector species</li> </ul>	<ul style="list-style-type: none"> <li>Develop/review WNV response plan.</li> <li>Review mosquito control program.</li> <li>Maintain source reduction projects.</li> <li>Secure surveillance and control resources.</li> <li>Review/update community outreach and public education programs.</li> </ul>
1	Low	<ul style="list-style-type: none"> <li>Biting adult mosquitoes active (vector species).</li> <li>-or-</li> <li>Activity expected based on onset of transmission in prior years.</li> <li>-or-</li> <li>Limited activity in birds or mosquitoes.</li> </ul>	<ul style="list-style-type: none"> <li>Response as in category 0, plus:</li> <li>Conduct Integrated Mosquito Management program to monitor and reduce vector mosquito abundance.</li> <li>Conduct environmental surveillance to monitor virus activity (mosquitoes, avian, mortality, etc.).</li> <li>Initiate community outreach and public education programs focused on personal protection and residential source reduction.</li> </ul>
2	High	<ul style="list-style-type: none"> <li>Sustained transmission activity in mosquitoes or birds.</li> <li>-or-</li> <li>Horse cases reported.</li> <li>-or-</li> <li>Human case or viremic blood donor reported.</li> </ul>	<ul style="list-style-type: none"> <li>Response as in category 1, plus:</li> <li>Intensify and expand adult mosquito control in areas using ground and/or aerial applications where surveillance indicates human risk.</li> <li>Intensify activities in community to increase attention to WNV transmission risk and personal protection measures.</li> <li>Work with collaborators to address high risk populations.</li> <li>Expand human case surveillance.</li> </ul>
3	Outbreak in progress	<ul style="list-style-type: none"> <li>Conditions favor continued transmission to humans (i.e., persistent high infection rate in mosquitoes, continued avian mortality, seasonal mosquito population decreases not anticipated for weeks).</li> <li>-or-</li> <li>Multiple confirmed human cases/donors.</li> </ul>	<p>Response as in category 2 plus:</p> <ul style="list-style-type: none"> <li>Intensify emergency adult mosquito control program repeating applications as necessary to achieve adequate control.</li> <li>Monitor effectiveness of vector control efforts.</li> <li>Emphasize urgency of personal protection, including use of repellents, through community leaders and media.</li> </ul>

Table 1. GCMAD WNV Response Matrix as adapted from West Nile Virus in the United States: Guidelines for Surveillance, Prevention, and Control. Centers of Disease Control and Prevention. 4<sup>th</sup> Revision. 2013. <http://www.cdc.gov/westnile/resources/pdfs/WNVGuidelines.pdf>

## Appendix B.

### GCMAD NPDES Pesticide General Permit Pesticide Discharge Management Plan (PDMP)

1. Pesticide Discharge Management Team:
  - a. Person(s) responsible for managing pests in relation to the pest management area:
    - i. Gem County Mosquito Abatement District staff, 6846 W. Highway 52, Emmett, ID 83617, telephone: 208.365.5628, email: director@gcmad.org.
  - b. Person(s) responsible for developing and revising the PDMP:
    - i. Jason Kinley, District Director, Gem County Mosquito Abatement District, 6846 W. Highway 52, Emmett, ID 83617, telephone: 208.365.5628, email: director@gcmad.org.
  - c. Person(s) responsible for developing, revising, and implementing corrective actions and other effluent limitation requirements:
    - i. Jason Kinley, District Director, Gem County Mosquito Abatement District, 6846 W. Highway 52, Emmett, ID 83617, telephone: 208.365.5628, email: director@gcmad.org.
  - d. Person(s) responsible for pesticide applications:
    - i. Jason Kinley, District Director, Gem County Mosquito Abatement District, 6846 W. Highway 52, Emmett, ID 83617, telephone: 208.365.5628, email: director@gcmad.org,
    - ii. Linda Cox, District Assistant Director, Gem County Mosquito Abatement District, 6846 W. Highway 52, Emmett, ID 83617, telephone: 208.365.5628,
    - iii. Shawn Hyde, District Field Operations Coordinator, Gem County Mosquito Abatement District, 6846 W. Highway 52, Emmett, ID 83617, telephone: 208.365.5628,
    - iv. Cody Johns, District Field Operations Coordinator, Gem County Mosquito Abatement District, 6846 W. Hwy 52, Emmett, ID 83617, telephone: 208.365.5628,
    - v. several for-hire applicators to be identified after May 15.
2. Problem Identification:
  - a. Pest problem description: The Gem County Mosquito Abatement District (GCMAD) was established in 1960 by election of the citizens in which it serves and was the result of immensely pestiferous mosquito populations and their impact on human health and welfare, economic potential, and tourism initiatives. The data used to identify the pest problems within the district has been generated through many years of surveillance and control operations conducted by district personnel. Figure 1 (page 7) depicts a portion of Gem County. The highlighted green area represents the current boundaries and jurisdiction of the GCMAD (Idaho State Tax Commission website, 2012).
    - i. Pest Identification: the GCMAD is known to contain 23 species of mosquitoes, although the district actively surveys and conducts control efforts primarily for 6 species listed below:
      1. *Anopheles freeborni*, the Western Malaria Mosquito, overwinters in sheltered locations and emerges in early spring. The species is one of the first biters of the season, attacking when the air is still cold. They bite freely from dusk to dawn. Females lay eggs in permanent water sources associated with poor irrigation practices.

2. *Aedes vexans*, the Inland Floodwater Mosquito, overwinters in the egg stage and there are generally one or more broods per season. Irrigation practices with poor drainage suits this species well. The females feed in shady places during the day and can be particularly annoying at dusk and after dark. They are troublesome biters and have a flight range of 1 to 5 miles.
  3. *Culiseta inornata*, the Winter Marsh Mosquito, prefers to feed on larger mammals, and at times, is very troublesome to livestock. Active biting by this mosquito can occur during the fall. Dusk is the most common time for biting activity. They are active flyers and can disperse 5 to 10 miles from their emergence sites.
  4. *Culex pipiens*, the Northern House Mosquito, is named so because of its close association with human habitation. The species is considered a domesticated mosquito species because of this close association. It is a multi-brood mosquito and eggs are laid in rafts in temporary and permanent sites, such as catch basins, retention ponds, road side ditches, and any open container where water may hold for ten days or longer. Birds are the preferred hosts for this mosquito. *Culex pipiens* is a vector of Western Equine Encephalitis (WEE), St. Louis Encephalitis (SLE), and WNV.
  5. *Culex tarsalis*, the Western Encephalitis Mosquito, overwinters in protected places such as cellars, outbuildings, culverts, animal burrows and other sheltered locations. Upon emerging, the female seeks a blood meal to mature her eggs. Preferred development sites include temporary to permanent water sites such as marshes, waste irrigation water, ditches, retention ponds, catch basins, and open containers. Females are persistent biters and prefer birds in the spring, then later turn to mammals and humans as a source for a blood meal. *Culex tarsalis* is a vector of WEE, SLE, and WNV.
  6. *Ochlerotatus nigromaculis*, the Irrigated Pasture Mosquito, is a common pest mosquito of the agricultural communities and surrounding areas of southern Idaho. It is a ferocious biter, inflicting a painful bite. It is a strong flyer and may migrate several miles from its development site. The primary habitat of this species has been largely created by agriculture; irrigated pastures are the most common development sites. The winter is passed in the egg stage with hatching occurring within hours of flooding. This mosquito species is capable of transmitting WEE, SLE, and California encephalitis virus.
- ii. Pest sources: pest problems can best be separated into 2 broad types within our service area that can be further divided into more specific groups based on habitat type.
1. Natural Environments:
    - a. River and creek floodplains in Gem County are associated with the Payette River and small tributaries that flow into it. In addition, many marshlands are associated with the Payette River drainage. Mosquito species commonly found in these environments include *Culex tarsalis*, *Culiseta inornata*, *Anopheles freeborni*, and *Aedes vexans*.

- b. Ponds, pools, natural springs and depressions are isolated wetlands occurring throughout the county within pasture areas. Examples of these habitats include ponds, sloughs, and depressions caused by soil erosion or grade degradation. Many of these sites only contain water during the wet seasons of the year, and serve as excellent nurseries for most species of mosquitoes found in our region.
- c. Other natural environments include seeps, tree holes, tree cavities, and burrows made by various species of wildlife. However, these as a whole are generally not a pressing concern to our mosquito program.

## 2. Man-made Environments:

- a. Ditches and canals are frequently suggested as sources of mosquito problems by the general public. However, these structures usually are seldom the primary source of a mosquito infestation, especially if these systems tend to hold water on a permanent basis or if the water is moving. On the other hand, shallow, roadside ditches do contribute to mosquito populations at times. Such sites often remain inundated throughout much of the year. Mosquito species encountered in such sites include *Culex tarsalis*, and *Culiseta inornata*.
- b. Livestock pastures can pose a serious problem to mosquito abatement, as the livestock not only provide a reliable blood meal for female mosquitoes, but form larval habitat from their hoof prints. Mosquito species associated with pastures in the GCMAD include *Ochlerotatus nigromaculis*, and *Aedes vexans*.
- c. Storm drains and catch basins are found in the more developed areas of the district, and provide a development habitat for *Culex pipiens* and *Culex tarsalis*, which serve as primary West Nile Virus vectors in Idaho.
- d. Containers come in all sorts of shapes and sizes. These may be represented by something as small as a bottle top to something as large as a discarded or unkempt boat. Containers serve as the primary larval site for container-breeding mosquito species which is frequently associated with mosquito problems in our more urban and suburban areas of the district.
- e. Other man-made sites include borrow pits, agricultural fields, retention and detention ponds, and gravel excavation sites. These areas generally do not cause problems except during drought conditions as many will contain fish. Agricultural fields, such as corn or alfalfa fields often are flood irrigated in Gem County and can cause problems when grading and drainage ditches fail.

b. Action Thresholds:

i. Larval Mosquito Control Thresholds:

1. Average of 1 or more larvae in five dip cup samples per treatment site. Actual treatments will be based on local demographics, mosquito species present, and other historic and current conditions.
2. The storm water system may be treated in selected areas of the district where vector species have been found or there is a history of arbovirus activity.
3. A limited number of known, historic development sites may be treated prior to larval presence because of limitations in time to inspect and treat all larval sites within the district.

ii. Adult Mosquito Control Thresholds:

1. *Culex* spp.:
  - a. 5 or more mosquitoes per New Jersey light trap per two consecutive nights
  - b. 5 or more mosquitoes per CDC trap per trapping event, prior to detection of WNV
  - c. 1 or more mosquitoes per CDC trap per trapping event, after detection of WNV.
2. *Anopheles* spp.:
  - a. 5 or more mosquitoes per New Jersey light trap per two consecutive nights.
3. *Aedes* and *Ochlerotatus* spp.:
  - a. 50 or more mosquitoes per New Jersey light trap per two consecutive nights.
4. Citizen complaints:
  - a. 5 or more complaint calls from an ultra-low volume (ULV) spray zone during a 5 day period.
  - b. 25 or more complaint calls across the entire district during a 5 day period.
5. Landing Counts:
  - a. Reports from staff of landing rates greater than 5 mosquitoes in a 1 minute period at any inspection site.
6. Larval Control Failure:
  - a. Any reports from technicians of a larval control failure at any development site within district jurisdiction.
7. Service Requests:
  - a. Limited area treatments may be conducted prior to special events or community functions, based on requests for service.

- c. General Location: Please refer to Figure 1 on page 32 of this document as a reference to where all applications to control mosquitoes will take place. All sites within the green highlighted area are subject to larval mosquito control and adult mosquito control applications. The Gem County Mosquito Abatement District (GCMAD) is located in the south western portion of Idaho. It is bordered by the

Payette River on the northern border and high elevation desert foothills south of the Emmett valley. It is bordered by Payette County, Idaho to the west and high elevation desert foothills to the east. The GCMAD has a land area of approximately 104 square miles, or approximately 66,560 acres. Within the district there are several Waters of the United States (Waters of the U.S.). Waters of the U.S. within the GCMAD jurisdiction include the Payette River, the Black Canyon Reservoir, Sevenmile Slough, Haw Creek, Bissell Creek, Anderson Creek, Johnson Creek, Sand Hollow Creek, and North Fork Willow Creek (as indicated on Figure 1). In addition there are several canals that feed from and to the Payette River. These canals include Black Canyon Canal, Last Chance Canal, Farmers Cooperative Canal, Kasgard/Chugi Canal, Enterprise Canal, Reed Ditch Canal, Noble Canal, Bilbrey Canal, and Stewart Ditch. There are also many ponds within district boundaries that were created by gravel extraction operations.



Figure 1. Southern portion of Gem County. The highlighted green area represents the current boundaries and jurisdiction of the GCMAD (Idaho State Tax Commission website, 2012).

- d. Water Quality Standards – Waterways in the GCMAD are not impaired with any pesticides or pesticide degradates used by the GCMAD.
3. Pest Management Options Evaluation: A description of the control measures to demonstrate how the operators specifically plan to meet the applicable technology-based or water quality-based effluent limitations.
    - a. No action or at least delayed action may be taken by the GCMAD at times when a major portion of the county has been inundated with water. When a county wide flooding event takes place it is generally more economical and environmental friendly to allow mosquito larvae to emerge and treat for adults at a later time. This is because not all larval habitats can be treated in a timely manner to prevent adult emergence, and adult mosquitoes will migrate into our service area from the surrounding regions that have no or reduced mosquito control resources. Conversely, no action may also be taken when sites containing larvae are shallow, and extended weather forecasts indicate dry

conditions. Such situations allow larval habitat to dry before mosquitoes can complete their aquatic life stages, and no adults result.

- b. Prevention; mechanical/physical methods; and cultural methods are by definition very similar in nature and share many characteristics. These methods can be as basic as simply emptying water from containers or as complex as repairing broken water lines which often require the involvement of other county departments, such as Public Works. Educational programming at local schools and area events allow the GCMAD staff the opportunity to suggest ways that residents can assist in the prevention of mosquito problems by removing containers and articles from their yards that provide larval habitat, and to be mindful that birdbaths and pet water bowls could serve as mosquito development sources when not properly maintained.
- c. Mechanical/physical methods are methods in which mosquito habitat is physically altered to remove or reduce the amount of available larval habitat and is difficult to incorporate for many reasons. Primarily, mosquito habitat on private property requires substantial input from the property owner and if the property owner does not want alterations to the property, the district does not have jurisdiction to do so without permission. Nonetheless, the GCMAD does have a cost sharing program in place for the reduction of mosquito development habitat on private property. Through the "50/50 Drainage Incentive Plan", the GCMAD intends to reduce and eliminate slack or standing water on private property that supports mosquito development. This program is designed to assist landowners financially in cleaning up mosquito development sources. With the cooperation of landowners, the GCMAD will locate mosquito development areas and, with a 50/50 reimbursement plan to property owners (up to \$1,000.00 GCMAD cost), drain and eliminate these areas. Landowners must send a letter of request for 50/50 cost-sharing consideration on a project, including 2 independent bids. Upon approval, landowners will be financially responsible for the project (GCMAD will reimburse the landowners half the cost up to \$1000.00).
- d. Cultural methods, like the previous two methods, manipulate larval habitat to prevent favorable conditions for mosquitoes to complete their aquatic development. Physical manipulation of environments such as removing blockages in ditches that serve as barriers to drainage or access for natural predators of mosquitoes are sometimes quick and effective means for control technicians to resolve problems on a localized level.
- e. Biological control agents:
  - i. Biological control agents used by the GCMAD includes formulations containing *Bacillus sphaericus* and/or *Bacillus thuringiensis israelensis*. Biological control agents are used to control mosquito larval sites within our jurisdiction. Application of biological larval control agents (larvicides) requires considerable personnel, equipment, materials, surveillance, and expense. However, this type of control application offers good long-term control of mosquitoes. Biological larvicides are applied using aerial applicators for widespread and hard to reach areas and all terrain vehicles (ATVs) for applications in accessible areas.
  - ii. In addition, natural predators could be viewed as biological control agents. The GCMAD has evaluated the mosquito control efficacy of several natural predators including insectivorous bats, dragonflies, praying mantids, fish (*Gambusia affinis* or other fish species), and purple martins and other swallow-like birds.
    1. Bats: insectivorous bat diets consist mainly of beetles, wasps, ants, flies, stoneflies, mayflies, moths, and grasshoppers.



Mosquitoes make up less than 1% of their diet. Location of bat houses should also be taken into consideration, emphasizing that bats carry rabies. Separation of bat houses from the human population is a good practice.

2. Dragonflies: dragonflies are already established in the valley. The GCMAD will do everything feasible to ensure that they are protected from district insecticide applications in the valley.
3. Praying mantids: praying mantids are already established in the valley. The GCMAD will do everything feasible to ensure mantids are protected from control applications in the valley. Praying mantids primarily feed on larger, non-flying insects that are terrestrial.
4. *Gambusia affinis* (mosquitofish): mosquitofish may be distributed and utilized in compliance with all IDFG regulations. The district may distribute mosquitofish to man-made, closed-container types of mosquito production sources as listed on page 2 and 3 if feasible and available. Mosquitofish are small fish that are members of the Poeciliidae family. All members of this family, which include the guppy, bear live young. They prefer warmer waters with temperatures and can withstand low dissolved oxygen levels and a wide range of salinity. They feed on a variety of items including mosquito larvae, zooplankton, fish and amphibian eggs and will attack larger fish. In some cases, they are effective for mosquito control because they are voracious feeders but are not selective for mosquito larvae. All mosquitofish living in states west of the continental divide are introduced. Research has not provided consistent evidence that mosquitofish are effective at controlling mosquito populations, with results ranging from no control at all to excellent success. Their use in many situations is likely to result in a false sense of security in controlling mosquitoes. Mosquitofish may be somewhat effective in artificial systems that don't contain natural mosquito predators, such as storm water management facilities, farm ponds, sewage lagoons and wastewater facilities. It is in these artificial isolated, high nutrient waters, which do not contain native mosquito predator species that the greatest benefit can be found from mosquitofish. It is important that these artificial water bodies do not flow into natural systems, in order to prevent mosquitofish from escaping into adjacent waters. As with many pest control methods, there are risks associated with using mosquitofish. Native amphibian, fish, and aquatic insect populations could be severely reduced or eliminated by their introduction. This occurs through predation on and competition for food with native species. Introduction of mosquitofish could worsen a mosquito problem by eliminating natural mosquito predators. Since mosquitofish would not qualify as a common aquarium or tropical fish, an IDFG import permit is required to bring them into the state. Sources from out of state would need disease clearance and verification that they do not come from Zebra Mussel contaminated waters or from the Great Lakes region where viruses are present. Any release of fish, including mosquitofish, into waters in Idaho requires a release permit from IDFG. A single annual permit can be provided to individual government agencies and mosquito abatement districts free of charge.

5. Blue Gill: Blue Gill fish populations are already established in Gem County ponds. This fish is proven to winter well in Idaho, and will readily feed on mosquito larvae.
  6. Purple Martins (swallow-like birds): in November of 1966, there was some interest in the valley to introduce purple martins as these birds were found to eat mosquitoes. Research was conducted about how to introduce the birds into this area. Attempts were made to introduce purple martins but establishing a migratory route through the Emmett Valley was unsuccessful. Through research, bird ornithologists discovered that purple martins and other swallow-like birds do not prefer mosquitoes and that the mosquitoes make up less than 3% of their diets.
  7. Note: to date, these methods have not been cost effective. A cost of up to \$50,000.00 per method per season, increased manpower to facilitate and monitor, and the ongoing use of pesticides by the agricultural community makes this type of control prohibitive at this time.
- f. Chemical control methods: a timely and appropriate response to mosquito, bird, and human surveillance findings is the key for preventing an outbreak or further spread of human disease. The GCMAD will implement a phased response to surveillance findings that will expand education, prevention, and control activities in relation to the threat of an outbreak of mosquito-borne disease. If mosquito surveillance indicators such as trapping results, landing rates, biting rate counts, and verifiable complaints from district constituents suggest that the level of mosquitoes pose a significant human discomfort or threat to health, mosquitoes will be controlled through the use of chemical mosquito control agents. Habitat, weather, time of year, and proximity to human populations will be considered in determining the necessity of chemical mosquito control. The accuracy, quality, and efficacy of insecticide applications will be closely monitored to ensure compliance with federal and state regulations. When the application of insecticides becomes necessary, it is often as the district's last choice of control measures. Products are applied as directed by their respective label using equipment that is closely monitored and calibrated and by licensed and trained GCMAD personnel.
- i. Chemical control of larval mosquitoes:
    1. The chemical control of larval mosquitoes includes the application of insecticides with several modes of action. Insect growth regulators, such as methoprene based products, interrupt the development cycle of mosquitoes. Larviciding oils can be applied to standing water, making it impossible for larvae to penetrate the surface film, therefore causing suffocation. Monomolecular films lower the tension of the water's surface, therefore making it impossible for larvae to "attach" to the surface for breathing purposes, and ultimately causes suffocation. Pyrethrins can be applied to standing water and ultimately kill mosquito larvae through a toxic interaction.
  - ii. Chemical control of adult mosquitoes:
    1. The objective of chemically controlling adult mosquitoes is to reduce the abundance of adult mosquitoes in targeted areas through the use of ultra-low volume (ULV) insecticide applications. All ULV treatments are restricted to property within the district's jurisdiction or within mosquito migrating distance to

the district and all treatments are applied according to the insecticide's label directions. All treatment equipment is calibrated as recommended by the insecticide label directions and is certified annually. There are several classes of adult mosquito control products available including organophosphate-based agents, pyrethrin-based agents, and synthetic pyrethroid-based products. These product classes are used in alternating abatement schedules as a precaution against insecticide resistance to one class of insecticide.

- iii. Operators must consider impact to non-target organisms, impact to water quality, pest resistance, feasibility, and cost effectiveness when evaluating and selecting the most efficient and effective means of pest management to minimize pesticide discharge to waters of the United States.
4. Response procedures: Spill response and adverse incident procedures are documented in following section as required.
- a. Spill response procedures: every pesticide applicator needs a plan for dealing with pesticide spills. Only by planning ahead can applicators be ready to react quickly to handle a spill properly. The time spent on preparing a plan will be extremely valuable in an emergency when seconds count. The first step in the plan is to identify the practices that increase the risk or danger of pesticide spills. These practices can be divided into three activities: storage, mixing/handling, and transportation.

Storage: no job is really finished until the pesticides, containers, and equipment have been put away properly. Creating the habit of storing all materials safely before cleaning up, or moving on to the next job will ensure spill prevention. While cleaning up and putting away pesticides, containers, and equipment, wearing all the personal protective equipment used on the job is necessary. Consider wearing gloves and other protective equipment, even if they weren't required on the label.

Mixing/handling: mix pesticides in a safe place. Mixing in the field eliminates the transportation of large quantities of mixed pesticide along city and county roads. Never mix pesticides near a wellhead, stream, or other potential water contamination source.

Transportation: when transporting pesticide containers, tie them down securely, carry clean-up equipment, take the best roads, and avoid streams or rivers. When going out to apply pesticides, check equipment thoroughly, avoid steep places, and drive with extreme caution.

- i. Spill Management - if a spill occurs, adhere to the following procedures:
  1. Control: Identify the source of the spill and try to stop it, preventing further spillage. For example, if a small container is leaking, place it in a larger waterproof container, if a hose has broken, turn off the pump. Isolate the area. Rope it off or place barriers around it. Keep people and animals at least 30 feet away from the spill. Avoid coming into contact with any pesticide or fumes.
  2. Containment: put on appropriate safety gear. At a minimum, a long-sleeved shirt, long pants, rubber or neoprene boots and gloves should be worn while cleaning up a spill. Depending on the product, the amount spilled, and whether the spill is within an

enclosed area or outdoors, a respirator and goggles may be needed. Wear the level of protective gear required on the pesticide label for use during handling the pesticide. Stop the spread of the pesticide spill. Place containment material around the spill or build a dam of soil. It is important to prevent the pesticide from entering any body of water, including storm sewers or sanitary sewers. Spread absorbent material such as kitty litter, vermiculite, or a commercial spill containment product over the remainder of the spill. Dry pesticides will not spread very far except during windy and/or rainy weather. Never hose down a spill, this only spreads the pesticide.

3. Clean up: continue to add absorbent material until all the liquid is soaked up. Shovel the contaminated material into a leak-proof container. Decontaminate the area. Common household bleach is usually an effective chemical on concrete or wood surfaces. Read the pesticide label for specific decontamination directions. For minor spills, apply activated charcoal to contaminated soil. For large spills, the only effective way to decontaminate soil saturated with pesticide is to remove the soil until no visible stain or odor is observed. Whether these soil clean-up methods are justified depends on which pesticide was spilled and how much was spilled.
4. Disposal: if possible, the spilled pesticide should be applied to a labeled site at or below the labeled rate. Contaminated soil and absorbent materials must be disposed of properly. Check pesticide label for proper disposal.

ii. Notification procedures:

1. Minor spills: minor spills are spills that do not involve injury to citizens or personnel, result in damage to vehicles and equipment, and do not result in contamination of Waters of the U.S.
  - a. Notify immediate supervisor or district office.
  - b. Refer to spill response protocol.
2. Major spills: major spills could involve injury to citizens or personnel, could result in damage to vehicles and equipment, or could result in contamination of Waters of the U.S.
  - a. If spill results in injury to citizens or personnel, call 911.
  - b. If spill results in damage to a vehicle, call 911 if needed and then contact district director.
  - c. If spill results in damage to equipment, determine severity and scope of spill, and assess whether or not emergency services are needed to protect people and Waters of the U.S. Contact emergency services if needed and then contact district director and immediate supervisor.
  - d. If spill results in potential contamination of Waters of the U.S., contact district director or district field supervisor. District director will contact local HAZMAT team, Idaho Department of Environmental Quality (DEQ) and regional EPA office.

b. Adverse Incident Response Procedures:

- i. Procedures for responding to any Adverse Incident resulting from pesticide applications:
  1. Once an Adverse Incident is observed, the operator shall notify the district director immediately.
  2. The district director shall determine whether or not the Adverse Incident is a result of applications or discharges made to Waters of the U.S.
  3. If it is determined that the Adverse Incident is a result of applications or discharges made to Waters of the U.S., the district shall cease all applications made to the area affected, and will report as required by the permit.
  4. The operator will then take appropriate steps to correct, repair, remedy, clean up, or otherwise address any adverse effects.
- ii. Procedures for notification of the Adverse Incident, both internal to the district, and external:
  1. If an operator observes or is otherwise made aware of an adverse incident, which may have resulted from a discharge from a pesticide application, the operator must immediately notify the district director and the appropriate EPA Incident Reporting Contact, as identified at [www.epa.gov/npdes/pesticides](http://www.epa.gov/npdes/pesticides). This notification must be made by telephone within 24 hours of the operator becoming aware of the adverse incident and must include at least the following information:
    - a. The caller's name and telephone number;
    - b. Operator name and mailing address;
    - c. If covered under an NOI, the NOI NPDES permit tracking number assigned by EPA;
    - d. The name and telephone number of a contact person, if different than the person providing the 24-hour notice;
    - e. How and when the operator became aware of the adverse incident;
    - f. Description of the location of the adverse incident;
    - g. Description of the adverse incident identified and the pesticide product, including EPA pesticide registration number, for each product applied in the area of the adverse incident;
    - h. Description of any steps the operator has taken or will take to correct, repair, remedy, clean up, or otherwise address any adverse effects; and
    - i. If known, the identity of any other operators authorized for coverage under this permit for discharges from the pesticide application activities that resulted in the adverse incident.
    - j. If an operator is unable to notify EPA within 24 hours, the operator must do so as soon as possible and also provide an appropriate rationale for why the operator was unable to provide such notification within 24 hours.
    - k. The adverse incident notification and reporting requirements are in addition to what the district is required to submit under FIFRA section 6(a)(2) and its implementing regulations at 40 CFR Part 159.

5. Documentation to support eligibility considerations under other federal laws:
  - a. Documentation will be kept with the Pesticide Discharge Management Plan that supports the determination that the GCMAD meets Criterion A of Section 1.1.2.4 (Endangered and Threatened Species and Critical Habitat Protection).

6. Signature and Declaration:

I, Jason R. Kinley, certify the Gem County Mosquito Abatement District's Pesticide Discharge Management Plan as in accordance with Appendix B, Subsection B.11 of the NPDES Pesticide General Permit ([http://cfpub.epa.gov/npdes/home.cfm?program\\_id=410](http://cfpub.epa.gov/npdes/home.cfm?program_id=410)).

\_\_\_\_\_  
Jason R. Kinley, Director

\_\_\_\_\_  
Date