



STATE OF DELAWARE  
DEPARTMENT OF NATURAL RESOURCES  
& ENVIRONMENTAL CONTROL  
DIVISION OF FISH & WILDLIFE

## DELAWARE MOSQUITO CONTROL SECTION

### FOGGING GUIDELINES FOR RURAL HOMEOWNERS (including when, where, and how we treat)

This document is intended for the individual rural property owner who has requested adult mosquito control, either as a first-time caller or as a past fogging recipient. The following information will describe what to expect and what you could or should do to prepare for this service. Due to an ever increasing human population moving into rural habitats of Delaware, often into areas having wet woodlands, riverine floodplains, or other freshwater wetlands, the Mosquito Control Section is progressively receiving more and more requests for adult mosquito control. Many of these requests are from residents who will receive Mosquito Control services for the first time. This document is designed to answer questions first-time callers might have about our procedures, and what steps first-time and previous callers can take to assist us in making our spray applications more effective and efficient.

#### **Q1. How does the Mosquito Control Section “spray” to control adult mosquitoes?**

A1. “Fogging” is the term generally used to describe ultra low volume (ULV) insecticide applications for the purpose of controlling adult mosquitoes. Fogging is only intended to kill the adult mosquitoes that are present *at the time of application*. The insecticides used in fogging activities to kill adult mosquitoes are called mosquito adulticides. Fogging does not provide any control for immature mosquito larvae that may be present in standing water around your property (mosquito control products used to control larvae are known as larvicides). This adulticide procedure is performed using a machine (sprayer) mounted in the back of a pick-up truck which puts out a very fine spray (“fog”) of insecticide. Unlike fogging efforts a few decades ago that use to rely upon hot thermal sprays that produced thick clouds or “fogs” of insecticide and carrier products combined, today’s modern ULV fogging involves only a very faint spray cloud that quickly dissipates to almost imperceptible levels within a short distance of the spray truck. This fog is designed to remain in the air for an extended period of time of at least several minutes, thereby increasing its ability to come in contact with the greatest number of mosquitoes. This procedure is usually performed in the evening hours beginning just before sunset and continuing for up to 4 hours thereafter, or in the 3-hour time period before sunrise and for a short time thereafter, to coincide with peak activity for most mosquito species, as well as the most stable atmospheric conditions. The Mosquito Control Section’s fog trucks always (unless there is a mechanical malfunction) indicate a driver’s immediate intention to begin spraying by activating a flashing strobe light. This strobe light is also operated while actively fogging.

Please keep in mind that the Mosquito Control Section’s first preference is to try to control mosquito production using non-chemical “source reduction” techniques, such as elimination of standing water where practicable, or by the stocking of mosquito larvae-eating fish where possible, with our also having to consider site-specific environmental compatibility factors when doing such. Our second preference for where “source reduction” can’t be used or fails to achieve control involves the application of larvicides, to treat only those aquatic locations

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where mosquito larvae are found. In situations where neither “source reduction” nor larviciding can be employed, or where neither yields satisfactory control, then we might have to resort to adulticiding as a third and last preference, which can be applied either via truck-based fogging or aerially via fixed-wing aircraft. When you call us for our fogging services, it usually indicates a situation where neither “source reduction” nor larviciding could be used (and there are many reasons that are often site-specific for why such practices couldn’t be employed), or for where the use of one or the other or both of these practices still failed to achieve satisfactory control (and there are also many reasons for failures of such approaches). The use of “source reduction” and larviciding around the state has certainly dramatically decreased our need to adulticide in many situations and locations, but nonetheless the need for occasional or even sometimes frequent adulticiding still persists.

## **Q2. What chemical is used for fogging, and is it safe?**

A2. The insecticide currently used by the Delaware Mosquito Control Section for fogging is permethrin (Permanone 31-66 or Biomist 31-66). It is classified as a synthetic pyrethroid insecticide and is registered by the U.S. Environmental Protection Agency (EPA) for mosquito control. All insecticides used in the U.S. must be registered and approved for such use by the EPA following the performance or review of many scientific studies. The EPA realizes that people and pets could be exposed to this product during normal mosquito spraying activities, and the EPA takes these facts into consideration when determining the product’s risk profile, allowable uses, and application procedures, routinely allowing for wide safety margins. The EPA has determined that when used according to all label directions, which by federal law must be done, mosquito control insecticides do not pose any unreasonable risks to human health, pets or wildlife, or the environment.

For more information about the possible (but only very slight) human health side effects of exposures to mosquito control insecticides during operational use, or for other types of pesticide exposures, contact the National Pesticide Information Center:

- Toll-free hotline: **1-800-858-7378**. Standard hours are 9:30 AM to 7:30 PM Eastern Time every day except holidays. After hours, callers can leave a voice mail message; the NPIC returns these calls on the next business day.
- EPA Pesticide Facts website: [www.epa.gov/pesticides/health/mosquitoes/pyrethroids4mosquitoes.htm](http://www.epa.gov/pesticides/health/mosquitoes/pyrethroids4mosquitoes.htm)

## **Q3. What precautions do we need to take (if any) before, during, and after the fogging treatment?**

A3. It has been our experience that simply limiting exposure (through whatever means you feel are necessary) is the best overall precaution one can take. However, even here as a result of the EPA’s rigorous product screening process and the agency’s determination of best application procedures, the EPA does not feel that any extra avoidance measures are really necessary. Many “veteran” fogging recipients feel that staying out of the treated area for 20-30 minutes is adequate (less if there is any breeze that would cause the product to dissipate more quickly). Because of the EPA’s “comfort level” in regard to any human health concerns from exposure to operational applications of mosquito control adulticides, there are no specific guidelines on the product label instructing people or pets to avoid or not come in contact with the product’s operational use in its final applied form (only common sense personal protection guidelines similar to any pesticide label).

## **Q4. How can I be notified when my property is scheduled to actually receive the fogging I requested?**

A4. Many complicated factors are involved with planning, preparing, and performing our spray operations, such as fluctuating wind or weather conditions (temperatures, rainfall), or varying intensities of adult mosquitoes

needing rapid response. Therefore, once a request is made by a rural homeowner, if you are really concerned or interested for whatever reason in the exact time when treatment will be performed on your property, then you need to be on the lookout for the Mosquito Control truck and its flashing yellow light primarily from about 30 minutes before sunset and continuing for up to 4 hours thereafter, on any evening where the wind is less than 10 mph and it's not actively raining (or rain is not imminent), or less frequently from about 3 hours before sunrise and until a short time thereafter. In order to learn when fogging might occur in your general area, you can receive our daily **Spray Announcements** automatically via e-mail by subscribing to our listserver notification system at [www.fw.delaware.gov/Services/Pages/MosquitoSection.aspx](http://www.fw.delaware.gov/Services/Pages/MosquitoSection.aspx). You can also have direct access to Mosquito Control's daily on-line spray announcements at [www.fw.delaware.gov/Services/Pages/MosquitoSection.aspx](http://www.fw.delaware.gov/Services/Pages/MosquitoSection.aspx).

If you do not have access to a computer or the Internet, several radio stations also broadcast **Public Service Announcements** concerning Mosquito Control's upcoming plans for spraying. We submit our spray announcements to many radio stations around the state on a daily basis, but unfortunately we have no control over if, when, or how often these stations might choose to run our spray notices. Our **Spray Announcements** are also updated daily on a **toll-free phone line at 1-800-338-8181**. This phone number can be called as often as you like to listen to taped announcements of our spray notices.

#### **Q5. How can I assist Mosquito Control staff in achieving the best possible control on my property?**

A5. In short, the greater the area we can cover on your property and in nearby locations, the better the control will be. Therefore, we advise rural homeowners to be prepared when possible to:

- 1) Have someone knowledgeable meet the driver upon arrival at your property to tell us exactly where it's acceptable to drive. Due to liability issues, homeowners will not be allowed to ride in the fog truck for any reason. If you do not wish to speak with the driver or fear you may not be home at the time of our visit, please give our office detailed instructions when you phone in your request as to where we may drive on your property. It is not necessary for you to be at home or to speak with our operator for us to still treat your property, but for some matters you might find this helpful or desirable for you to do.
- 2) To the extent practicable, move laundry, vehicles, boats, trailers, toys, pets, or other obstructions that might impede where our fog truck can drive.
- 3) Open access gates to allow entry to other areas of the property (pastures, paddocks, fields, etc.) that might warrant treatment.
- 4) Please ensure that your address and/or name are clearly posted in a manner such that we can positively identify your property and driveway.

Please keep in mind that the Mosquito Control Section conducts fogging using a full size, two-wheel-drive pick-up truck. Do not direct the driver to transit areas where they might get stuck, alarm livestock, or damage septic or underground sprinkler systems. We will not be responsible for any damage to property if it occurs where our staff was instructed to drive. Additionally, if someone from the home is not available or unable to speak with our staff member within a few minutes of their arrival, the driver will use their own best professional judgment to determine proper areas on which to drive and where to treat. Be aware that their discretion usually errs on the side of caution for where they will go (or really not go), thereby often resulting without homeowner guidance in less area possibly being treated.

It should also be noted that the driver will use whatever breeze might be occurring to help disperse the insecticide over the greatest amount of area. Fogging recipients should know that the computer system used to control the

insecticide application rate adjusts with the speed of the truck to automatically ensure that the appropriate amount of product is being dispensed. Even though the truck may seem to be going faster than usual, the new computerized system is linked directly to the truck, and puts out the appropriate amount of product based on the speed that it is traveling.

Please also keep in mind that our staff generally has a long list of fogging requests, and in the interest of fulfilling those requests, our staff needs to be conscience of the treatment time spent at each location. Be aware that it is ultimately up to the driver's discretion as to how much area to cover (and also where to treat) to provide adequate control in an appropriate or allowable amount of time for treatment. Several staff members within our program share the responsibility of fogging, so each individual might not be fully aware of all areas on your property where fogging had previously been allowed or performed, so please be prepared to possibly share or repeat this information as part of each treatment event. Additionally, based upon subsequent "post-fog" adult mosquito population monitoring that we might be able to perform on your property or in nearby areas, we may treat your property more than once relative to your initial request. However, please do not rely on any needed follow-up treatment occurring automatically. You will need to make additional requests as warranted to ensure additional visits.

**Q6. What happens when the fogging doesn't provide satisfactory control?**

A6. Truck-based fogging is a relatively limited, focal area response to an intolerable biting mosquito situation, and as such on occasions our fogging efforts might not achieve control results that seem to last for very long (e.g. mosquitoes might be back "as bad as ever" within only 24-48 hours). The immediate and short-term control results in areas where our spray clouds are applied and can then drift within the effective swath width (up to about 300 feet from the truck) are almost always outstanding, resulting in >90% "knockdown" or control of previous mosquito levels. However, control will only be noticeable in those areas actually affected by the spray, and even here the good results at times might not seem to last very long.

There are 2 primary causes for this occasional lack of longer term control. Most commonly when control seems to "fail" or not last very long, it's due to relatively rapid reinvasion of treated locations by adult mosquitoes from nearby (or even at times somewhat distant) locations that weren't treated. Obviously the larger an area that can be treated when fogging, the less likely chance for rapid reinvasion problems for any property within a fog block or zone; but here we are up against time and resource limitations for what our program can practicably treat, as well as our often encountering physical constraints for where our fog trucks can operate. Less commonly a rapid reoccurrence of a mosquito problem on your property stems from an eruptive emergence of new adult mosquitoes from areas on your property or nearby. This latter undesirable outcome can be somewhat lessened by your taking measures to eliminate or dump any standing water on your property that you don't need and that might persist for 4 or more consecutive days.

Whenever you encounter a situation where biting mosquito populations are still truly intolerable soon after we have fogged, you can of course always recontact us to request additional treatment, If we're able to fog a large enough area on your property or in your vicinity, or if you're in a location not having many areas nearby that harbor reinvasion sources of mosquitoes, then our initial fogging effort will often give you the relief you seek for a reasonable length of time (from several days up to a few weeks). But if not, please recontact us.

**Q7. How do you determine when and where to fog, or whether you'll treat at all?**

A7. Whether a request for fogging might be an initial request or involve a plea for relatively quick follow-up treatment, we use a combination of factors to determine if treatment will actually be provided, including: 1) the

amount or density of public complaints that might come from a given area, which is often a paramount factor in our “spray/no spray” decisions; 2) adult mosquito landing rate counts (mosquitoes landing per minute on a person) locally encountered by our staff field inspectors; and 3) adult light trap counts from any on-site or nearby areas associated with our statewide mosquito population monitoring program, involving fixed or mobile sampling stations. For the parameters of landing rate counts and adult light trap counts, we have established spray threshold (“trigger”) criteria to help guide our “spray/no spray” decisions.

We expect the public to tolerate at least relatively low levels or numbers of biting mosquitoes, and this expectation for at least some tolerance will be a bit higher in more rural, sparsely populated areas than in more densely populated cities, towns, suburbs, hamlets or subdivisions. Whenever we receive a significant amount of public complaints from an area, or we have indication of a severe mosquito infestation based upon reliable observers, landing rate counts, or adult light trap counts, we then try to provide relief within limits of our programmatic resources. Our willingness and need to provide such services can become even more marked when we have recent indications of mosquito-borne pathogens in an area or region, which we assess and determine through our statewide arbovirus surveillance program (that monitors for eastern equine encephalitis and West Nile virus, both which can affect humans or horses).

Please understand that even after our doing all of this, there are times when mosquito infestations can simultaneously be so bad in so many areas that this then forces us to triage our fogging efforts. Our prioritizations for when and where to fog are then based upon the relative severities of local mosquito infestations, along with our considering the greatest number of suffering citizens who can be served by any given treatment action or “fog run” (with this latter consideration being one of “best return-on-investment” when fogging). As such, please understand that these factors can sometimes cause your property or vicinity not to get fogged as quickly as you might like, and on some rare occasions perhaps not to be treated at all.

**Q8. Why not send your airplane to spray my property, especially if truck-based fogging might not do the trick, or has failed to provide relief?**

A8. There are locations and times when intensive mosquito outbreaks have become so widespread or pervasive that our truck-based fogging efforts simply can’t provide the local level of relief needed or demanded, due to our not being able to fog enough acreage to prevent rapid reinvasions from untreated areas. When we’re occasionally confronted with this unfortunate situation, then in order to effectively treat all the acreage that needs to be treated to prevent rapid reinvasions, we might have to resort to more widespread aerial application of adulticides using fixed-wing aircraft (airplanes). However, we prefer not to have to do this for 2 reasons. First, aerial adulticiding typically involves broadcast applications of broad-spectrum insecticides over widespread areas, and in comparison to truck-based fogging causes greater pesticide loading over the landscape -- in an abundance of caution, we try to minimize our pesticide use to the extent practicable. Second, aerial adulticiding in comparison to fogging is a rather expensive undertaking – while aerially applied adulticiding might be a less costly treatment on a per acre basis, the much greater total acreage involved when aerially adulticiding can quickly lead to much greater total costs when responding to a mosquito outbreak (in comparison to trying to control the outbreak relying solely upon fogging). As such, we still first try to do what we can via truck-based fogging, sometimes involving our attempting a second (or even third) fogging of some or even many properties; but there can come a point where aerial adulticiding becomes the only practicable, effective solution, and when such happens we won’t hesitate any longer to aerially adulticide. We will also be more likely to consider and resort to aerial adulticiding during the times of year when mosquito-borne pathogens have become most amplified within the environment, whereby the specter for having mosquito-caused disease outbreaks becomes greatest, which in Delaware typically occurs from about late July through early October.

Finally, you must keep in mind that when we make a decision to aerially adulticide, this is usually in association with a widespread, severe mosquito outbreak, and similar to truck-based fogging we're then typically confronted with having to triage where we'll now be aerially spraying. Our prioritizations for when and where to aerially treat are then based upon the relative severities of local mosquito infestations, along with our considering the greatest number of suffering citizens who can be served by any given aerial application (with this latter consideration being one of "best return-on-investment" when aerially spraying). As such, please understand that these factors can sometimes cause your property or vicinity not to be aerially sprayed during a time when we might be aerially adulticiding elsewhere, although in such situations it's still highly probable that you would at least receive some truck-based fogging.

For further information on mosquito control in **New Castle County and northwestern Kent County** (north of Route 300 & Route 42 and west of Route 9), please call our upstate operational H.Q. in Glasgow at **836-2555**. For similar information for **the remainder of Kent County and all of Sussex County**, please call our downstate operational H.Q. in Milford at **422-1512**.

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