MOSQUITO CONTROL IN DELAWARE

Why does the State need to control mosquitoes?

- To reduce intolerable nuisance problems that lower quality-of-life.
- To prevent outbreaks of mosquito-borne diseases such as encephalitis.
- To lessen impacts to local economies based on animal husbandry, tourism or outdoor recreation.

How does the State control mosquitoes?

Mosquito control in Delaware is performed statewide by the Delaware Mosquito Control Section, an agency in the Division of Fish and Wildlife, Department of Natural Resources and Environmental Control. The Section has a three-tiered approach for controlling mosquitoes that integrates best management practices to reduce insecticide use.

- The first-tier uses various source reduction methods in the areas where mosquitoes breed by selectively excavating ponds or ditches in salt marshes to provide habitat for native fishes that eat mosquito larvae (a practice called Open Marsh Water Management); or by managing water levels in impounded coastal marshes to reduce breeding sites; or by seasonally stocking fish that eat mosquito larvae in freshwater wetland ponds or stormwater management basins.

- The second-tier treats wetlands, standing water and other mosquito breeding areas with insecticides to stop larval mosquitoes from emerging as adults.

- The third-tier applies insecticides to control adult mosquitoes, which might be necessary to do over or within populated areas as a control measure of last resort. This method is only used when the first two approaches fail to achieve satisfactory control.

Applications of larvicides or adulticides are done by aircraft or truck-mounted sprayers, and larvicides are sometimes applied by backpack sprayers or hand tosses. All spraying is done in conjunction with a vigilant mosquito surveillance and monitoring program, to ensure that insecticides are sprayed only when and where needed. In combination with non-insecticide source reduction methods, this approach forms a modern, integrated pest management program for controlling Delaware's mosquito populations.

How does the State decide when insecticide applications are necessary?

There are two considerations for determining when mosquito populations are of enough concern to require control measures. The first consideration assesses mosquito abundance through the use of larval dipping counts, adult light-trap collections, or adult landing rate counts, as well as by the number and location of public nuisance complaints. If the numbers of mosquitoes observed exceed established threshold criteria whereby nuisance or quality-of-life problems will soon occur or are actually happening, then control measures are implemented.

The second consideration monitors the presence of mosquito-borne disease viruses, either by directly testing mosquitoes themselves, or by testing blood samples from sentinel chickens for evidence of virus transmission. The field samples are collected by the Mosquito Control Section using a statewide network of 26 surveillance stations, with virus testing done by the Delaware Division of Public Health Laboratory. If disease virus is detected, this information is combined with assessments of mosquito population abundance, to either change threshold criteria for taking control actions, or to indicate geographic areas of special concern.

What insecticides does the State use?

When it is necessary to use insecticides, only products registered by the U.S. Environmental Protection Agency (USEPA) are used, which must be applied in accordance with all USEPA-approved label instructions. The use of insecticides in Delaware is overseen by the Delaware Department of Agriculture's Pesticide Compliance Section.

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Currently, five types of insecticides are used for mosquito control in Delaware. These include 3 larvicides – the microbial larvicide ***Bacillus thuringiensis Israelensis*** (Bti – Vectobac, Aquabac, Teknar); the juvenile growth hormone mimic ***methoprene*** (Altosid); and the organophosphate ***temephos*** (Abate). Larvicides are typically applied over marshes or other wetlands, where people are usually not likely to be.

Two types of adulticides are used, which in their routine application may come in contact with people, since these products are applied as aerosols near, over or within populated areas.

Resmethrin (Scourge) or ***sumithrin*** (Anvil) are synthetic pyrethroid adulticides used to control mosquitoes and other insects. These synthetic compounds imitate natural insecticides found in chrysanthemum flowers. Both compounds have low toxicity to mammals, and break down quickly in sunlight or when exposed to air. Resmethrin and sumithrin are considered by the USEPA to pose little risk to humans when used at the low concentrations for mosquito control.

Naled (Dibrom, Trumpet) is an organophosphorus adulticide. It is primarily registered for use on land to control adult mosquitoes and blackflies. Naled is also used on some food and feed crops to control pests. When applied at low concentrations as required by the label for mosquito control purposes, naled is considered by the USEPA to pose little risk to humans.

How safe are the insecticides that are used?
The insecticides being used for mosquito control, whether larvicides or adulticides, are registered and approved for mosquito control by the USEPA and have gone through rigorous testing to assure that there are negligible adverse effects to human health or the environment. These insecticides have been developed to affect insects while being relatively non-toxic to humans and other mammals, along with being short-lived in the environment. The USEPA has determined that these mosquito control insecticides, when used in accordance with USEPA-approved label instructions, can be applied without posing unreasonable risks to human health, wildlife or the environment. The currently used adulticides are applied as ultra-low volume (ULV) formulations, which allows very small quantities of active ingredients to be used. All insecticide applications carried out for mosquito control are conducted or supervised by licensed pesticide applicators, who have been trained in safe usage and application of insecticides.

What precautions could I take to reduce my exposure to insecticides?
As mentioned above, insecticides used for mosquito control are registered by the USEPA for spraying near, over or within populated areas, and can be applied without posing unreasonable risk to human health. However, there are some steps that can be taken to help further reduce any concerns about insecticide exposure. These measures could include staying indoors and closing windows during spraying, or washing any exposed skin with soap and water after direct contact. In the unlikely event you feel you are experiencing adverse health effects following insecticide application, you should seek medical care.

Who do I call for more information?
An information packet containing the Mosquito Control Section's "Spray Policy," pertinent USEPA factsheets, and technical information (product label, MSDS) about selected adulticides is available by contacting:

Dept. of Natural Resources and Environmental Control (DNREC), Mosquito Control Section	(302) 739-3493
Dept. of Agriculture (DDA), Pesticide Compliance Section	(302) 739-4811
Division of Public Health (DPH), Environmental Health Evaluation Branch	(302) 739-6619

Pesticides and Mosquito Control. United States Environmental Protection Agency (USEPA). Office of Pesticide Programs. http://www.epa.gov/opp00001/citizens/mosquitocontrol.htm
The EXtension TOXicology NETwork (EXTOXNET) Cooperative effort of University of California-Davis, Oregon State University, Michigan State University, Cornell University, and the University of Idaho. http://www.ace.orst.edu/info/extoxnet/