DELAWARE MOSQUITO CONTROL SECTION

FAQ #2. Why do we need mosquito control? What do you do this for?

If you were the caller in FAQ #1 contacting us about intolerable mosquito nuisance problems around your home, then you already know a prime reason for why we're in business. At one time before the advent of modern mosquito control practices in Delaware, dating back essentially to the late 1950s and before, many developed areas of the First State (e.g. downtown Dover!) would more than occasionally experience severe mosquito infestations having landing rate counts of biting adult mosquitoes from 20-50 per minute up to 100 bites per minute, which through **nuisance or annoyance** greatly diminishes an area's **quality-of-life**. A landing rate count of only 1-2 mosquitoes per minute in your backyard on some balmy summer evening would translate within a half-hour into 30-60 bites affecting exposed parts of your body, clearly not a desirable situation. Imagine how long you'd stay outside in a setting of 20-50 bites per minute, with truly ghastly counts of 100 bites per minute having been documented! And as more-and-more people move into Delaware, and as they increasingly seem to all want to live in areas near coastal wetlands or wet woodlands, demands for our control services (and upon our program's limited resources) only continue to escalate.

In addition to personal discomfort from such infestation levels, uncontrolled mosquito populations can also have **significant adverse impacts to local economies** based upon tourism, outdoor recreation, or animal husbandry, along with undesirable effects on your neighborhood's property values. As such, our delivery of mosquito control helps to maintain a good quality-of-life and robust economy throughout many areas of Delaware – without our continuous, behind-the-scene control efforts, a large portion of modern Delaware would not be very livable from April through early November. Many visitors coming to our coastal resort areas from Baltimore, Washington, northern Virginia, the New York City area, northern New Jersey, Philadelphia, southeastern Pennsylvania, Wilmington, Newark or other urban regions do not realize how naturally "buggy" a place they have chosen to visit. It is somewhat bemusing when some of these good folks first realize what we have to do to make their visit a relatively pest-free (and disease-free) experience – incongruously, they'll sometimes ask: "What do you need mosquito control for?!!! The number of mosquitoes flying around here aren't that bad."

Another major reason for controlling mosquitoes is their well-known potential for **carrying and transmitting pathogens that can cause diseases**, not only just to humans, but also to our domesticated animals such horses or dogs. In Delaware today, we are concerned with encephalitis viruses such as **eastern equine encephalitis (EEE)**, an alphavirus, which when either humans or horses contract EEE can often be fatal, with special concern for children and elderly. Those who recover from EEE are often left with lifelong debilitating symptoms – there is a EEE vaccine for horses, but not for humans. Fortunately, the occurrence of EEE is relatively rare, and the Mosquito Control Section works hard to keep it this way. **West Nile virus (WNV)**, a flavivirus, is a recently-introduced Old World encephalitis virus first coming into the country in 1999 in the New

York City area, carried by wild birds and mosquitoes that has now spread from coast-to-coast. This virus first appeared in Delaware in 2002, and is now well established throughout the state. West Nile Virus is not as virulent as EEE, but nonetheless contracting WNV is still quite a medical concern for the elderly or people having impaired immune systems. [A more in-depth discussion of the health problems and symptoms associate with contracting EEE or WNV is provided in FAQ #10.] An effective WNV vaccine has now been developed for horses, but if a WNV vaccine is ever developed for humans, it's still several years away. The occurrence of EEE and WNV in nature involves complex transmission cycles of several mosquito species and wild birds (songbirds play a very prominent role here), with a branching off to humans and horses in these cycles as "dead end" hosts for encephalitis viruses. Other encephalitides of much more minor concern in Delaware include **St. Louis Encephalitis (SLE)**, another flavivirus, which at times has had epidemic outbreaks in the central U.S. and Florida; as well as the potential for **LaCrosse Encephalitis (LAC)**, a bunyavirus, which is usually associated with the mid-West. Mosquito bites per se, even without pathogen transmissions, are also a human health problem, as mothers can readily attest when their children are festooned with numerous bites and can't fall asleep all night long. Excessive numbers of mosquito bites per se, sans any pathogen transmission, can cause allergenic problems at bite sites (or even systemically) for extremely sensitive individuals, can lead to secondary infections from aggressively scratching bites sites (children are most prone to doing this), and can cause psychogenic problems from mental anguish/torment. Another mosquito-caused problem in Delaware is **canine heartworm**, a mosquito-borne pathogen often fatal to dogs, so dog owners are urged to put their dogs on preventive medication to avoid this problem.

Many Delawareans are probably not aware that so-called "tropical" diseases, such as **yellow fever** (a flavivirus) or **malaria** (a protozoan parasite, *Plasmodium* spp.), were at one time quite common in the southeastern United States, including areas as far north as Delaware and even into New England. A yellow fever outbreak in Philadelphia in 1793 killed 10% of the city's residents and sickened another 20%. Malaria was a serious problem for Civil War soldiers throughout the southeast, including Confederate prisoners confined to Fort Delaware on Pea Patch Island, and as recently as only a few years ago isolated but locally-transmitted cases of malaria surfaced in New Jersey and Maryland. Many a colonial estate or antebellum plantation owner along the southeastern seaboard, including areas of the mid-Atlantic, knew that come summer it was time to seek refuge further inland or up in the mountains for themselves and their privileged families, to thereby avoid the "swamp ague" that often somehow caused great sickness for those less fortunate who had to remain behind. **Dengue ("breakbone") fever**, a flavivirus, is currently a mosquito-borne problem throughout the Caribbean and Mexico, with recent occurrences in southern Texas, plus potential for this disease in other Gulf Coast states too. A serious outbreak of dengue recently occurred in Hawaii -- the hemorrhagic form of dengue can often be fatal. **Elephantiasis** is a mosquito-borne disease caused by roundworms, and while primarily occurring in Africa and southeast Asia, there are also problem areas in northern South America. It is only through continued vigilance and proactive implementation of modern mosquito control practices within the United States, combined with good disease screening and follow-up medical care, that these "tropical" diseases are no longer major concerns in the lives of most modern Americans, including

Delawareans. But an example of a mosquito-borne disease that might prove to be the next newly emerging infectious disease in the United States is **chikungunya**, an alphavirus causing debilitating febrile illness and incapacitating joint pain, originating from Africa that in recent years has caused major disease outbreaks in India; and most recently in fairly alarming manner, chikungunya had spread to temperate climes in Italy, in concert with how both people and organisms can now rapidly travel around the globe. Modern-day mosquito control practices must be vigilantly and aggressively employed if we are to avoid or lessen the global spread of these mosquito-borne ills.

Delaware has about 57 species of mosquitoes that breed in the widest range of aquatic habitats, and over a dozen of these species are very problematic for people. Problem-causing mosquitoes originate from our coastal marshes, in wet woodlands and swamps, and in many urban or suburban locations where they can prolifically breed in almost any type of man-made structure or container that collects and holds water for 4 days or longer. A newly-arrived problem species since the late 1980's in Delaware (and throughout much of the eastern and central United States) is the **Asian tiger mosquito**, which was accidentally imported from the Far East with scrap tires destined for recapping, and which is now the #1 urban problem-mosquito from New Orleans to Chicago to Baltimore, and in Delaware because of its abundance and aggressive daytime biting behavior now causes problems from Wilmington to Dover to Seaford and Rehoboth.

With over 20% of Delaware's surface area consisting of either tidal marshes or wet woodlands, and with the state also having a relatively high human population density along with an abundance of domestic breeding sites, there are plenty of opportunities for mosquitoes to raise a ruckus, both for our residents statewide and for visitors to our coastal resort areas. For the most part, many Delawareans well know why we must perform mosquito control in Delaware, and for over 75 years there has been a strong call for organized mosquito control within the First State. Under a clearcut statutory mandate from our citizens, the Mosquito Control Section tries our best to provide these desired quality-of-life and public health services, doing such in as environmentally-compatible manner as practicable to do.

As natural resource management professionals charged with mosquito control responsibilities, we are asked to perform some complex undertakings. We are tasked to somehow reach into the environment to eliminate or nullify a suite of **quality-of-life, public health, and economic problems** of serious concern to many Delawareans. These problems are generated by organisms that in their immature stages are found throughout the state in almost every type of aquatic habitat imaginable (with exception of the middle of fast-running streams), and which if uncontrolled are airborne as adults and capable of widespread dispersal and much pestilence. The most practicable modern control tools that we have at our disposal are insecticides that we must judiciously spray over or within wetlands or other mosquito production habitats to control immature stages, but which we also sometimes have to directly apply over or within where people live, work or recreate to control adult mosquitoes. We also employ various wetland management techniques for larval control that must be carefully installed or implemented in very sensitive, very valuable environments.

It is not unusual for many people to understandably demand even more mosquito control than what we can reasonably deliver given environmental constraints and our available operational resources. In contrast to these numerous requests for control treatments, other folks without a good understanding of what we do and how we have to do it are sometimes quite critical of our control methods. Indeed, we do not have an easy mission to fulfill, but we always try to do our best in serving the public.