



# FEMA

## RECOVERY POLICY – RP9523.10

### I. TITLE: **Eligibility of Vector Control (Mosquito Abatement)**

### II. DATE:

### III. PURPOSE:

This policy describes the criteria the Federal Emergency Management Agency will use to determine eligibility for vector control (mosquito abatement) measures.

### IV. SCOPE AND AUDIENCE:

The policy is applicable to all major disasters and emergencies declared on or after the date of publication of this policy. It is intended for personnel involved in the administration of the Public Assistance Program, including applicants.

### V. AUTHORITY:

Section 403 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121-5206, and 44 CFR §206.225(a)(3)(i).

### VI. BACKGROUND:

A. Mosquito-borne illnesses continue to pose significant risks to parts of the population of the United States. Heavy rains and flooding caused by natural disasters can produce significant increases in biting mosquito populations in a short period of time in both inland and coastal areas. The increase in standing water not only provides additional habitat for mosquito egg laying by potential vector species of *Culex*, but also causes *Aedes* and *Psorophora* mosquito eggs to hatch that have lain dormant for months or even years. Typically, the first brood of adult mosquitoes will emerge from the standing water within 5-10 days of the disaster event. These adults will persist for 2-4 weeks and will lay additional eggs during their lifecycle. The result can be an enormous increase in the density of several mosquito species following a natural disaster. If standing water persists for long periods or is replenished by repeated rainfall, flooding, or normal drainage patterns are altered by the effects of the disaster event, increased mosquito production may continue for several weeks or months.

B. Certain species of mosquitoes are important vectors of West Nile Virus and other viral encephalitides in the U.S. (e.g., eastern equine encephalitis, western equine encephalitis, Saint Louis encephalitis). Dengue, also spread by mosquitoes, is endemic in the Caribbean and Mexico, and local transmission has been documented with increasing frequency in Texas.



# FEMA

## RECOVERY POLICY – RP9523.10

C. Disaster events may increase the risk of mosquito transmitted disease when epidemic virus transmission is occurring in the area prior to the disaster and the additional mosquitoes prolong or expand the epidemic. The increase in vector mosquitoes may also promote or intensify virus amplification from low levels (enzootic or background levels). Increases in human exposure (residents or responders) to vector mosquitoes further enhance risk.

D. Many states and local governments have ongoing programs to monitor the levels and types of vector populations and associated viral infections in animals and humans. Based on the pre-disaster “background level” of virus in mosquitoes, public health officials are able to monitor changes in arbovirus transmission levels in a disaster-affected area.

E. A large population of biting mosquitoes can pose an immediate threat to public health even when evidence of vector-borne diseases is not present or significant in the disaster affected area. Of particular concern are the following:

1. An extraordinary or unusual number of biting mosquitoes that can seriously impede response efforts. Workers that are required to work out-of-doors (i.e., debris removal operations, protection of damaged structures, restoration of power and telephone service, etc.) can often be significantly hampered in their work.

2. Housing may be compromised due to extended power outages (i.e., windows and doors are opened), which could increase the general public’s exposure to mosquitoes. This could in turn result in secondary infections, especially among those with weakened immune systems such as the elderly, the very young, or the sick.

### VII. DEFINITIONS:

A. **Aedes:** The genus name for a mosquito that transmits yellow fever and dengue.<sup>1</sup>

B. **Arbovirus:** A virus utilizing arthropods as vectors and is transmitted via their feeding to a definitive host.<sup>2</sup>

C. **Culex:** Common mosquito genus comprised of 29 species in North America.<sup>2</sup>

D. **Dengue:** An infectious tropical disease transmitted by mosquitoes and marked by fever, rash, and sever joint pain.<sup>1</sup>

E. **Encephalitis:** A pathological condition characterized by inflammation of the brain.<sup>2</sup>



# FEMA

## RECOVERY POLICY – RP9523.10

F. **Enzootic:** A level of disease endemic in animals. An enzootic disease is constantly present in an animal population, but usually only affects a small number of animals at any one time.<sup>2</sup>

G. **Landing Rate:** An adult mosquito surveillance measure utilizing human volunteers as bait. Expressed as number of mosquitoes landing per minute.<sup>2</sup>

H. **Methoprene Briquettes:** A formulation of methoprene (compound that mimics the action of an insect growth-regulating hormone and prevents the normal maturation of insect larvae) growth inhibitor and a timed-release carrier that resembles a charcoal briquette. Briquettes are designed to control mosquitoes in small bodies of water artificial water-holding containers.<sup>2</sup>

I. **Psorophora:** Mosquito genus comprised of 13 species in North America.<sup>2</sup>

J. **Sentinel Organism:** An organism, usually fowl, purposely exposed to mosquito bites outdoors to monitor pathogen transmission by mosquitoes.<sup>2</sup>

K. **Seroconversion:** The development of detectable antibodies in the blood of a sentinel organism directed against an infectious agent.<sup>2</sup>

L. **Trap Count:** The number of female mosquitoes captured in a trap receptacle each night the traps are set.<sup>2</sup>

### VIII. POLICY:

A. **Vector Control for Disease-Carrying or Extraordinary Mosquito Populations.** Vector control measures may be eligible in the disaster area as emergency protective measures under 44 CFR §206.225(a)(3)(i). FEMA may provide reimbursement for such costs at the written request of the State or local public health officials after FEMA consults with the Centers for Disease Control and Prevention (CDC), based on the following:

1. Evidence of higher levels of disease transmitting mosquitoes in the disaster area following the event or a significant number of disease-carrying mosquitoes in the area due to the increase in event-related standing water; or evidence of the potential for disease transmission and human exposure to disease carrying mosquitoes based on the detection of arboviral diseases in sentinel organisms (poultry, wild birds, mosquito pools) in the impacted area: prior to the storm event, discovered during surveillance as part of mosquito abatement activities, or reported human cases in which transmission occurred prior to the storm event. Presence of known primary and secondary vector species in an affected area may presage future event-related disease transmission.



# FEMA

## RECOVERY POLICY – RP9523.10

2. A determination that a significant increase in the mosquito population and/or the change of biting mosquito species poses a threat to emergency workers who are required to work out-of-doors; thereby significantly hampering response and recovery efforts. Such evidence may include an abnormal rise in landing rates or trap counts, significant changes in species composition or estimate of infection rates, when compared to pre-disaster surveillance results.

3. Verification from medical facilities within the affected area that an increase in the general public's exposure to mosquitoes has directly resulted in secondary infections, especially among those with weakened immune systems such as the elderly, the very young, or the sick. This may occur when increased numbers of residents in disaster areas with extended power outages are forced to open buildings for air circulation.

**B. Monitoring Mosquito Populations and Disease Transmission Levels.** Where possible, a determination of the need for vector control measures should be based on surveillance data provided by local agencies, or on surveillance conducted as a component of the emergency response. Similarly, termination of control efforts should be based on mosquito density and disease transmission monitoring, and on the degree of exposure to mosquitoes of residents and responders. Information useful in determining the need for emergency mosquito control measures includes:

1. The local jurisdiction's mosquito population density estimates pre- and post-disaster, including information about species composition.

2. Arbovirus transmission activity indices, including information about the location of surveillance activities. Indices may consist of:

- a. Infection rates in mosquitoes.
- b. Seroconversion in sentinel chickens.
- c. Equine cases.
- d. Human cases.

3. Additional information that assists in making an assessment of needs includes:

- a. The amount and type of flooding (e.g., saltwater/freshwater, coastal/inland).
- b. The extent and location of damage to housing.
- c. The extent, location, and anticipated duration of power interruption.
- d. The anticipated extent and duration of cleanup/recovery operations.



# FEMA

## RECOVERY POLICY – RP9523.10

4. Description of the type of mosquito management required (e.g., aerial or ground-based adulticide applications, larvicide applications), and duration of application to reduce the threat and the areas where the interventions are needed.

**C. Abatement Measures.** Insecticide formulations must be among those approved and registered by the U.S. Environmental Protection Agency for use in urban areas for mosquito control, and must be applied according to label directions and precautions by appropriately trained and certified applicators. Furthermore, mosquito abatement measures must comply with all federal, State and local laws, ordinances, and regulations concerning vector control. Below are frequent types of vector control used but are not limited to the following:

1. **Adulticiding.** The ground or aerial spraying of insecticides to kill adult mosquitoes.
2. **Larviciding.** The application of chemicals, including methoprene briquettes, by ground or aerial to kill mosquito larvae or pupae.
3. **Breeding Habitat Removal/Alteration.** The modification of potential breeding habitat to make it unsuitable for mosquito breeding or to facilitate larval control. This includes draining or removing standing water in close proximity to homes, schools, sheltering facilities, and businesses.
  - a. Efforts may include increased dewatering through the pumping of existing drainage systems.
  - b. Dissemination of information (e.g., inserting flyers with resident's water bills, public service announcements, or newspaper campaigns) to direct residents to remove the mosquito breeding habitat.

**D. Federal Assistance.** FEMA may reimburse applicants for eligible mosquito control measures or may provide direct federal assistance through a mission assignment. The procedure listed below should be followed:

1. The applicant provides documentation addressed in Section 8B of this policy to the State Public Health Department for evaluation.
2. Upon positive verification of a vector threat, the applicant contacts the State Emergency Management official or its primary point of contact with the Public Assistance staff, usually a Public Assistance Coordinator (PAC).



# FEMA

## RECOVERY POLICY – RP9523.10

3. A FEMA representative will consult with CDC regarding the applicant's written request.

4. Following consultation with CDC, FEMA will provide assistance, as appropriate, based on FEMA's eligibility parameters.

### E. Eligible Costs.

1. FEMA will only reimburse for the increased operating cost for mosquito abatement. This is calculated by comparing the disaster related costs to the last three years of expenses (whether through force account or use of contractors) for the same period.

2. The description of the type of mosquito management and duration of application are required to establish the eligible scope of work.

3. FEMA will assist in generating equipment rates if the applicant cannot produce their own.

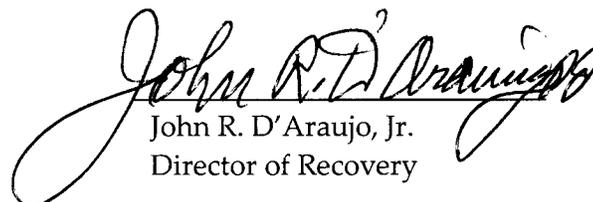
4. Costs for information dissemination as outlined in Section C.3.(b) of this policy may be reimbursed upon verification of expenses.

**F. Consultation with CDC.** FEMA will consult with the CDC Division of Vector-Borne Infectious Diseases to evaluate a State's request for assistance under this policy.

**IX. ORIGINATING OFFICE:** Recovery Division (Public Assistance Branch)

**X. SUPERSESSION:** This policy supersedes all previous guidance on this subject.

**XI. REVIEW DATE:** Five years from date of publication.

  
John R. D'Araujo, Jr.  
Director of Recovery

<sup>1</sup> Webster's II New Riverside University Dictionary; copyright 1994 by Houghton Mifflin Company.

<sup>2</sup> Joseph M. Conlon, Technical Advisor, American Mosquito Control Association.