

# MONITORING OF WATERWAYS FOR MOSQUITO INSECTICIDES IN SUFFOLK COUNTY, NY

By

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To date, the majority of field studies on mosquito insecticides have been in freshwater ecosystems and do not give insight into the environmental fate, persistence, and toxicity of these compounds in marine ecosystems. One objective of this study was to measure the presence and concentration of a wide range of mosquito insecticides, including those currently used by the Suffolk County Vector Control (SCVC), in water, suspended sediment, and bed sediment in salt marshes of Long Island, N.Y., as well as the relationship between these concentrations and the total organic carbon content of the sediment. Another objective was to evaluate the toxicity of the treated salt marsh bed sediment to the amphipod *Hyallela azteca*.

Sample sites include the salt marshes Beaverdam Creek (BC), Gardiner's Park (GP), Fireplace Neck (FN), Smith Point North (SN), Timber Point (TP), Unchachoque Creek (UC), and Fire Island Wilderness Area (WA). The freshwater non-tidal Carlls River (CR) was also sampled. Whole water and bed sediment samples were collected in 2009 approximately 30 minutes after aerial applications of Altosid® (methoprene; daytime samples) and Scourge® [1:3 ratio of resmethrin and the synergist piperonyl butoxide (PBO); nighttime samples] to determine the environmental fate and persistence of these insecticides. Bed sediment samples were collected in 2010 after aerial applications of Altosid® and Scourge® to measure the pesticide concentrations and to evaluate the toxicity of the sediment to *H. azteca*. Aerial applications and sampling were suspended when conditions favored wind drift.

Methoprene and resmethrin were detected in filtered water samples, suspended sediment, and bed sediment. PBO was detected in filtered water samples and bed sediment.

Dichlorodiphenyltrichloroethane (DDT) and metabolites *p,p'*-dichlorodiphenyldichloroethylene (DDE) and *p,p'*-dichlorodiphenyldichloroethane (DDD) were detected in bed sediment. DDE and DDD were also detected in suspended sediment. Initial analysis indicates a correlation exists between the concentration of methoprene and the percent of organic carbon in the sediment ( $r(8) = 0.77, p = .02$ ). Five of 13 sediment toxicity samples collected in 2010 were considered toxic to *H. azteca*, whereas control samples showed no toxicity. There is no relationship between percent mortality and concentrations of insecticides present in the 2010 samples; however, a positive correlation exists between percent organic carbon and percent mortality ( $r(13) = 0.56, p = .04$ ). This suggests that other adsorbed compounds not analyzed for may be contributing to the toxicity observed.

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