

Identifying Sources of Toxicity to *Hyaella* in the Santa Margarita Watershed

Matt Rich¹, John Rudolph², Arlene Chun³, Armand Ruby⁴

¹MACTEC Engineering and Consulting, Inc., San Diego, CA, USA, ²Nautilus Environmental, LLC, San Diego, CA, USA, ³Riverside County Flood Control and Water Conservation District, Riverside, CA, USA, ⁴Armand Ruby Consulting, Inc., Capitola, CA, USA

ABSTRACT

Since the summer of 2007, Riverside County Flood Control and Water Conservation District has been conducting a Toxicity Reduction Evaluation (TRE) for the Santa Margarita River (SMR) Watershed in accordance with the County's NPDES Municipal Separate Storm Sewer (MS4) Permit. The TRE is required to address the causes of toxicity observed in the SMR watershed during wet weather monitoring.

During the 2004-2006, toxicity to *Hyaella azteca* was observed in samples from Temecula Creek and Murrieta Creek during five of eight wet weather events. Toxicity testing during the 2007-2008 reporting period indicated persistent wet weather toxicity. A Toxicity Identification Evaluation (TIE) was conducted, and concentrations of pyrethroids in the samples were analyzed. The TIE indicated that pyrethroids were the primary source of toxicity in both creeks. Dry weather samples also were tested for toxicity and pyrethroids. Neither toxicity nor pyrethroid pesticides were detected in the dry weather samples, indicating that pyrethroid-induced toxicity is primarily a wet-weather issue.

The second step of the TRE was to identify sources of pyrethroid pesticides within the watershed. Relevant scientific literature, pesticide sales and use records, and GIS land use evaluations were reviewed. Uses of pyrethroids were broken down into agricultural, non-agricultural, structural, landscape maintenance, and other categories. Land use data indicated that less than 10 percent of the watershed is urbanized, however, the predominant uses of pyrethroid pesticides appear to occur in urban areas.

The pyrethroid pesticides bifenthrin and permethrin appear to be the primary toxic elements. Based on sales and use records, the major sources of pyrethroid toxicity in the SMR watershed are non-agricultural activities. Structural pest control appears to represent 93% of the total pyrethroids use. Permethrin was used more than any other pyrethroid pesticide in the urban landscape.

This study presents the toxicity and pyrethroid concentration data collected during the current Permit period. TIEs are discussed in detail, as many of the techniques used are highly involved and not yet standardized. Methods for conducting the TRE are described. Results of the source identification efforts are included, as well as a comparison of the data to neighboring counties.