

INSECTICIDES: Narrative for simple conceptual diagram

Many human activities and associated sources can contribute to high insecticide concentrations in aquatic systems, which can potentially lead to lethal and sub-lethal effects on aquatic organisms. Sources associated with urbanization (e.g., wastewater treatment plants) and industry (e.g., insecticide manufacturing plants) may directly discharge effluents containing insecticides into streams. Agricultural, silvicultural and urban land uses often involve the application of insecticides to control a variety of insect pests. These applied insecticides may be transported atmospherically, and may enter streams via stormwater runoff or via leakage or leachate into groundwater. The extent to which these transport pathways occur depends upon several factors, including timing and rates of application, precipitation patterns, and environmental persistence of the insecticides.

In streams, insecticides may be dissolved in the water column or associated with sediments, and the effects they have will depend upon the medium in which they occur. Exposures may be episodic (e.g., pulsed deliveries of insecticides with stormwater runoff) or sustained (e.g., long-term exposure to insecticide-contaminated sediments), and the bioavailability, uptake, and toxicity of insecticides during these exposures will vary with environmental conditions (e.g., temperature).

Increased insecticide concentrations within streams can result in decreased condition, decreased growth, altered behavior, increased susceptibility to other stressors, increased mortality, and decreased reproductive success in affected biota (macroinvertebrates may be especially susceptible), and ultimately may alter population and community structure and ecosystem function.