# Pesticide Usage in Strawberry Production and Water Quality

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What is a TMDL?  A TMDL is an EPA required plan to address a surface water quality problem. In a TMDL project we identify water quality impairments, identify sources, assign a load allocation to the water body and develop a plan to address the water quality problems.  *A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water qulity standards.*

In the Santa Maria Watershed many surface waters in watersheds with urban and agricultural land use and run-off have pesticide impairments (Bradley Canyon Creek, Bradley Channel, Blosser Channel, Main Street Ditch, Orcutt Creek, Green Valley, The Santa Maria River and Estuary and Oso Flaco Creek and Lake).  There are impairments for water column and sediment toxicity.  There are specific pesticides detected in the water and sediment at concentrations known to cause toxicity (chlorpyrifos, diazinon, malathion and synthetic pyrethroids).  In addition we have legacy pesticides still found in sediment and fish and sand crab tissue at levels of concern to human health.

## Problem Statement

We have many pesticide related water quality problems and I selected a couple that relate to strawberry production.

- Water quality data from various sources CCAMP, CMP, DPR and special studies indicate sediment toxicity to invertebrates in drainages in the Santa Maria Valley. Concentrations of pyrethroids were detected in the sediment at levels known to cause toxicity to invertebrates.
- As part of the TMDL I analyze the sources of pesticides in the watershed above monitoring sites.  One of the pyrethroids detected is bifenthrin.  Some drainages have a mix of urban and agricultural run-off others are primarily one or the other. For example Oso Flaco is primarily ag.  On the ag side bifenthrin is used almost exclusively on strawberries.  On the urban side it is commonly used by homeowners and commercial applicators.

## How is it getting into Streams?

Some things to think about are environmental fate and transport of pesticides the crop production cycle and the time of applications, and management measures to prevent the offsite movement of pesticides.

- Low solubility, high sorption coefficient (low risk to groundwater but can move off site bound to sediment).

- Soil half-life 97 to 250 days, aerobic half-life in sediment 12 to 16 months, and aqueous photolysis half-life 276 to 416 days.
- It is stable, moves of site in sediment. We could have post-harvest or preplant movement.
- Applications are during the growing season when plants are on drip.
- BMPs? Avoid drift and keep sediment on farms. The drip irrigation during the establishment period, cover crops, vegetation between rows.

## Regulations

- Ag Order, is focused on Ops and there is a meeting to proposed for June 1st in Santa Maria.
- DPR monitors urban drainage statewide and has identified urban run-off as a significant problem. DPR has new urban run-off regulations that address professional insecticide applications.
- DPR has pyrethroids under reevaluation and the registrant is investigating problems.
- EPA Spray Drift Language for Pyrethroid Agricultural use products
  - Vegetattive Buffer Strip: Construct and maintain a minimum 10-foot-wide vegetative filter strip of grass or other permanent vegetation between the field edge and down gradient aquatic habitat.
  - Only apply products containing biffenthrin onto fields where a maintained vegetative buffer strip of at least 10 feet exists between the field and down gradient aquatic habitat.
  - Buffer Zone for Ground Application: Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes, reservoirs, rivers, streams, marshes, ponds, estuaries, and commercial fish ponds). Almost all waters on the central coast are designated as aquatic habitat.
- What is Aquatic Habitat? Environments characterized by the presence of flowing or standing water.
- Homeowners? Water Board stormwater programs