

Pesticides Detected in Ground Water and Surface Water. Nels C. Ruud, Environmental Scientist and Michael P. Ensminger, Senior Environmental Scientist (Specialist), California Department of Pesticide Regulation, 1001 I Street, P.O. Box 4015, Sacramento, CA 95812. Nels.Ruud@cdpr.ca.gov, Michael.Ensminger@cdpr.ca.gov

The California Department of Pesticide Regulation (DPR) includes the Ground Water Protection Program (GWPP) and the Surface Water Protection Program (SWPP) within its Environmental Monitoring Branch. The GWPP began addressing pesticide contamination of groundwater in the early 1980s, spurred by the discovery of contamination of groundwater from the legal applications of the fumigant DBCP. Reports of additional pesticides in groundwater led to the passage of the Pesticide Contamination Prevention Act (PCPA) in 1985. The purpose of the PCPA is to prevent further pollution by agricultural pesticides of groundwater used for drinking water supplies. It established a program to identify pesticides that have the potential to pollute groundwater, requires sampling to determine if those pesticides are present in groundwater, directs DPR to maintain a database of all wells sampled by all agencies for pesticides, and requires DPR to conduct a formal review to determine whether the use of the detected pesticides can be modified to protect groundwater. During 2013 and 2014, more than 6,600 unique wells in California were sampled between DPR and other agencies with 27 different agricultural chemicals (i.e., active ingredients or their degradation products) being found in groundwater. About 60% of the detected chemicals were active ingredients (or their degradation products) from DPR's Ground Water Protection List (3 CCR Sections 6800(a) and 6800(b)). Recent legislative changes to the PCPA will allow for formal review and possible re-regulation of certain parent active ingredients (alachlor, metolachlor, DCPA) based on the detection of their degradation products in groundwater.

SWPP conducts monitoring studies in several major urban and agricultural areas in the state. In addition, SWPP collects monitoring data from outside agencies, which is housed in the Surface Water Database (<http://www.cdpr.ca.gov/docs/emon/surfwtr/surfcont.htm>). Perusing this data, between 2010 and 2014, 90 studies by eight major organizations have monitored almost 200 chemicals. Differences exist between urban and agricultural (ag) monitoring programs. More pesticides have been monitored in ag areas (182 pesticides) than in urban areas (140 pesticides). Herbicides (57 urban; 67 ag) are most frequently monitored, followed by insecticides (46 urban; 61 ag), pesticide degradates (29 urban; 35 ag), and fungicides (6 urban; 14 ag). A few fumigants and synergists are also monitored (2 urban; 5 ag). Pesticides detected frequently are cause for concern, especially those with a higher potential for aquatic toxicity. Of herbicides, in ag monitoring, metolachlor, pendimethalin, oxyfluorfen, diuron, and trifluralin are frequently detected at concentrations that have potential toxicity to aquatic organisms. In urban areas, only diuron and pendimethalin meet these criteria. Synthetic auxin herbicides frequently detected in urban runoff do not pose a high aquatic toxicity potential. Of insecticides, imidacloprid and pyrethroids (ag, bifenthrin, lambda-cyhalothrin; urban, bifenthrin, cyfluthrin, permethrin) are frequently detected at levels potentially toxic to aquatic organisms. In ag monitoring,

chlorpyrifos and methoxyfenozide are also a concern, but in urban monitoring, fipronil (and its degradates) are. Reducing or preventing runoff of these pesticides is prudent.