U.S. Department of the Interior
U.S. Geological Survey

National Water-Quality Assessment Program—Summary of Pesticide Data Collected on West Prong Old River near Dayton, Texas, March to September 1994

NAWQA
Fact Sheet

The Trinity River Basin study-unit assessment began in October 1991, with 2 years dedicated to planning, analyzing existing information, and designing data-collection networks, surveys, and studies. Then, a 3-year intensive data-collection program was initiated. The assessment followed guidelines provided by the National Water-Quality Assessment (NAWQA) Program National Synthesis team and considered suggestions made by the study unit's liaison committee. One of the issues selected for study concerned the quality of runoff in the coastal prairie. The study includes collecting streamflow, water-quality, and watershed data on three streams, each representing watersheds in different parts of the coastal prairie. This fact sheet presents a summary of the pesticide data collected on West Prong Old River from March to September 1994.

Description of Study Area

The study area is the West Prong Old River watershed that is located west of Dayton, Texas. The watershed is flat, has clay-rich soils, receives an average of 52 inches of rain each year, and has a subtropical climate. These features are characteristic of the coastal prairie in southeast Texas.

The study area covers about 25 square miles. It has a network of water-delivery canals and channelized waterways for improved drainage. Because of the flat topography, canals, waterways, and roads, the natural drainage area and pattern have been greatly altered. Land use in the study area is mostly cropland with approximately equal amounts of rice, sorghum, soybeans, and hay. Other major land uses include turf farms and pasture for raising cattle. Population is estimated to be less than 500 and distributed throughout the study area.

The application of pesticides in the watershed is dominated by the use of herbicides on rice crops. The most commonly used herbicides are thiobencarb (Bolero (trade name)), quinclorac (Facet), molinate (Ordram), bentazon (Basagran), propanil, and 2,4–D. The rice crop also is treated with fungicides such as benomyl (Benlate), propiconazole (Tilt), and iprodione (Roveral). A variety of herbicides are used on hay and turf farms; along rights-of-way for roads, canals, and waterways; and near residences on lawns and gardens. Some insecticides such as carbaryl (Sevin),

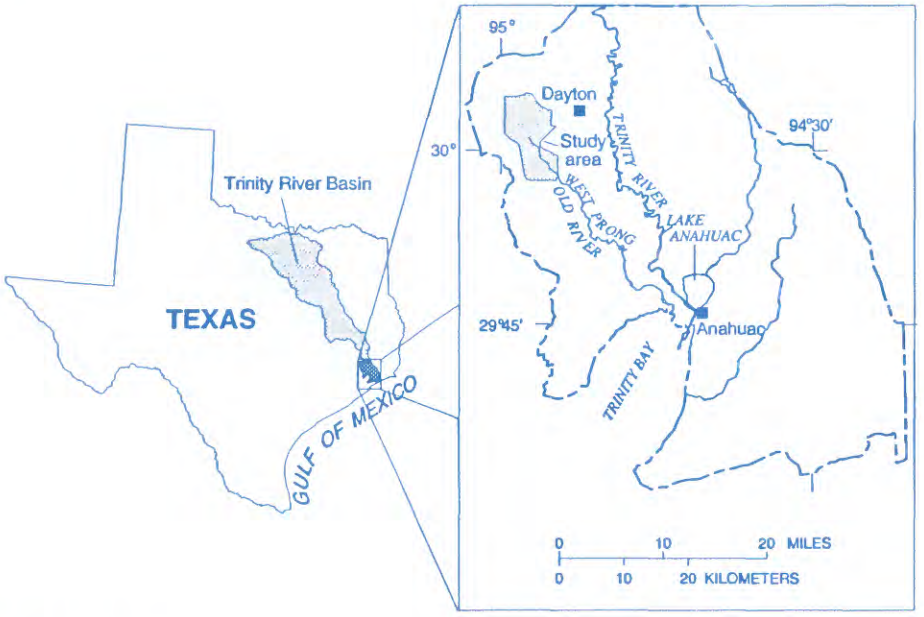

Figure 1. Location.

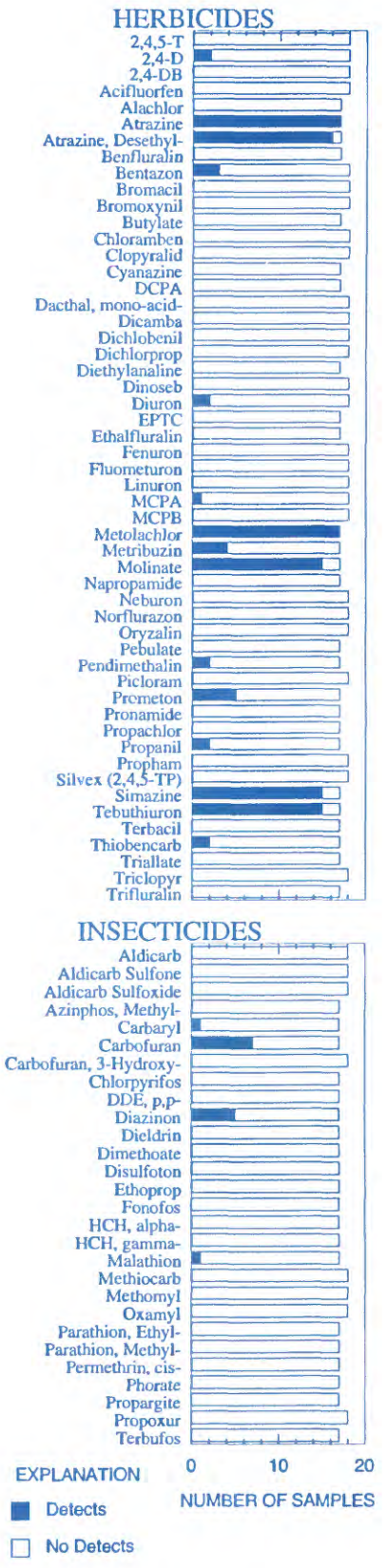

Figure 2. Pesticide detections.

malathion, and diazinon are used near residences, on cattle, and on rice crops.

Data Collection

One water-quality monitoring site was established on West Prong Old River, at the downstream end of the study area. Sampling began in March 1994 and will continue for 1 year. Sampling frequency ranges from four times per month in May and June to once per month in July. Stream-stage measurements were made three times per week from April to September. Field measurements during sampling include stream stage and discharge, water temperature, pH, dissolved oxygen, and specific conductance. Laboratory analyses include major inorganic ions, nutrients, sediment, and pesticides.

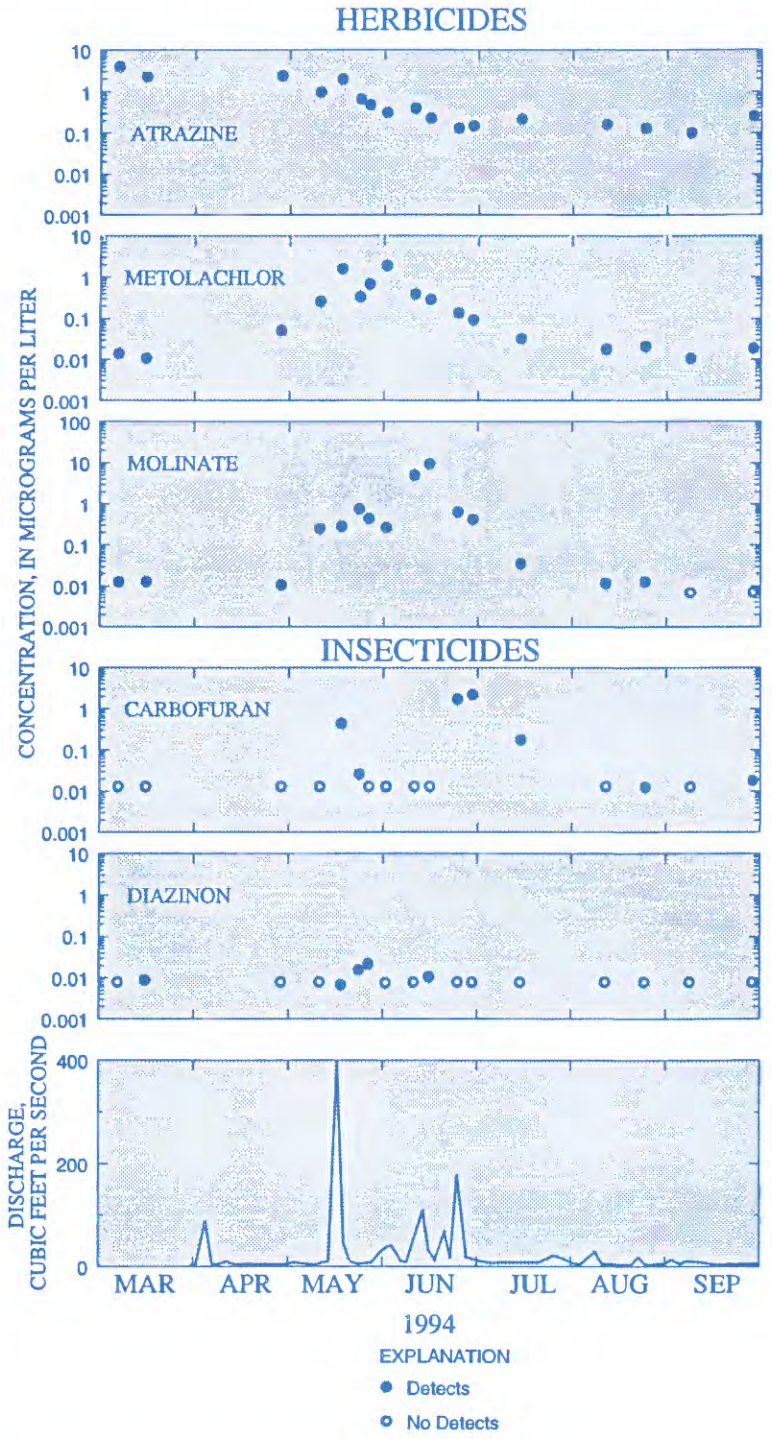

Figure 3. Selected pesticide concentrations and stream discharge.

Summary of Pesticide Data

Two laboratory methods are used for analysis of pesticides. One is known as Gas Chromatography/Mass Spectrometry (GC/MS) and the other as High Pressure Liquid Chromatography (HPLC). Both of these methods have a variable detection level which varies by compound and from sample to sample but commonly is near or slightly below 0.01 microgram per liter. These methods identify and determine the concentrations for about 80 pesticides. However, other pesticides are being used in the study area, including the commonly used quinclorac herbicide.

Herbicides detected in at least half the samples include atrazine, desethylatrazine, metolachlor, molinate, simazine, and tebuthiuron. No insecticides were detected in about 70 percent of the samples.

The greatest number of detections and the highest concentrations of pesticides were for samples collected in May, June, and July. Molinate, a herbicide commonly used on rice, had the highest concentrations, 10 micrograms per liter, in June. Carbofuran, an insecticide, was detected at more than 1 microgram per liter in June.

The U.S. Environmental Protection Agency (USEPA) has set the Maximum Contaminant Level (MCL) for drinking water for atrazine at 3 micrograms per liter and for carbofuran at 40 micrograms per liter. Concentration of atrazine in early March was the only one that exceeded these levels. No MCL values have been set for metolachlor, molinate, or diazinon; nor has USEPA set ambient water-quality criteria for aquatic organisms for these five pesticides in freshwater or salt water.

Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

For more information, please contact:

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