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

National Water-Quality Assessment Program—Summary of Pesticide Data Collected on East Fork Double Bayou, near Anahuac, 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 East Fork Double Bayou from March to September 1994.

Description of Study Area

The study area is part of the East Fork Double Bayou watershed that is located east of Anahuac, 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 is upstream of a salt-water barrier on East Fork Double Bayou, covers about 60 square miles, and has an extensive network of water-delivery canals and channelized waterways for improved drainage. Because the flat topography is intersected by canals, waterways, and roads, the natural drainage area and pattern have been greatly altered. Land use in the watershed is mostly pasture for cattle. Some of the land is used for growing rice and hay. Oil and gas wells are common throughout the watershed. Population is estimated to be less than 500, mostly in one rural community. Two large sanitary landfills are currently in operation.

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 farms; along rights-of-way for roads, canals, and waterways; and near residences on lawns and gardens. Some insecticides such as

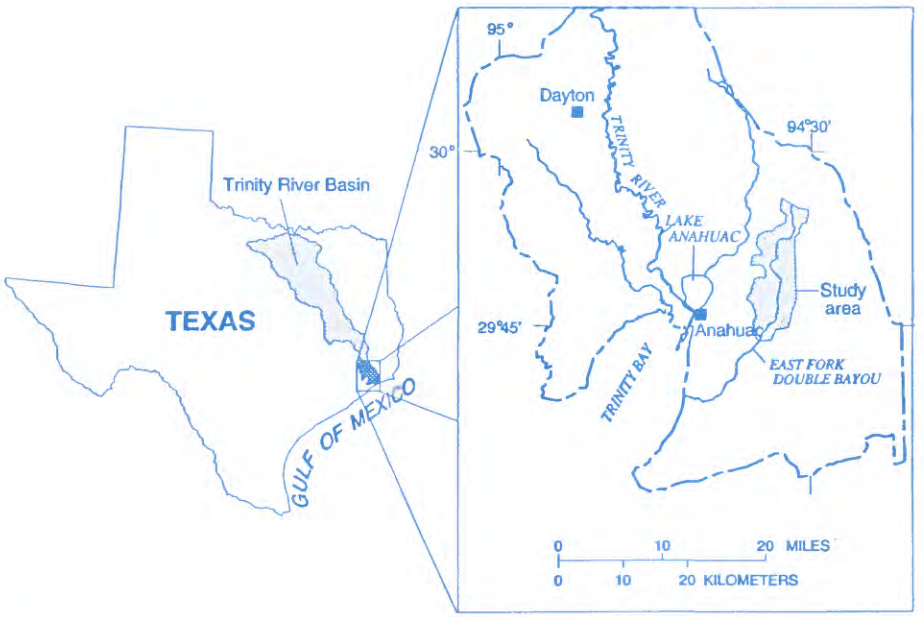

Figure 1. Location.

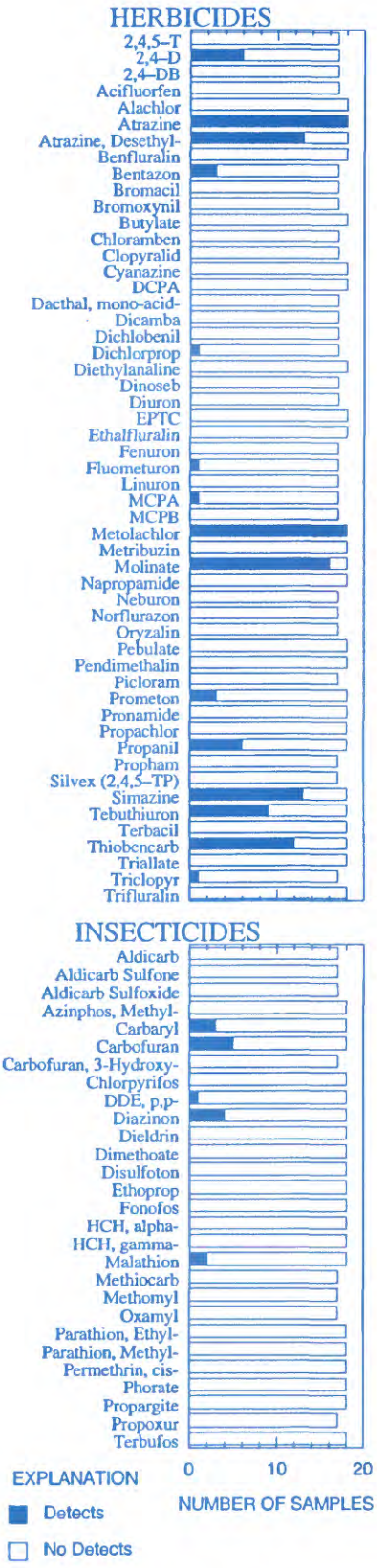

Figure 2. Pesticide detections.

carbaryl (Sevin), malathion, and diazinon are used near residences, on cattle, and on rice crops.

Data Collection

One water-quality monitoring site was established on East Fork Double Bayou, at the downstream end of the study area. Sampling began in March 1994 and will continue for 1 year. Sampling frequency ranges from five times during June to once 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.

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 that 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, desethyl-atrazine, metolachlor, molinate, simazine, tebuthiuron, and thiobencarb. 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, greater than 10 micrograms per liter during May and June. Carbofuran, an insecticide, had concentrations between 5 and 10 micrograms per liter during parts of June. No fungicides were detected. High discharge in mid-May seemed to temporarily reduce the herbicide concentrations. High discharge in August and September did not seem to change the pattern of pesticide concentrations.

The U.S. Environmental Protection Agency (USEPA) has set the Maximum Contamination Level (MCL) in drinking water for atrazine at 3 micrograms per liter and for carbofuran at 40 micrograms per liter. Concentrations of atrazine and carbofuran were less than these levels in all samples. 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.

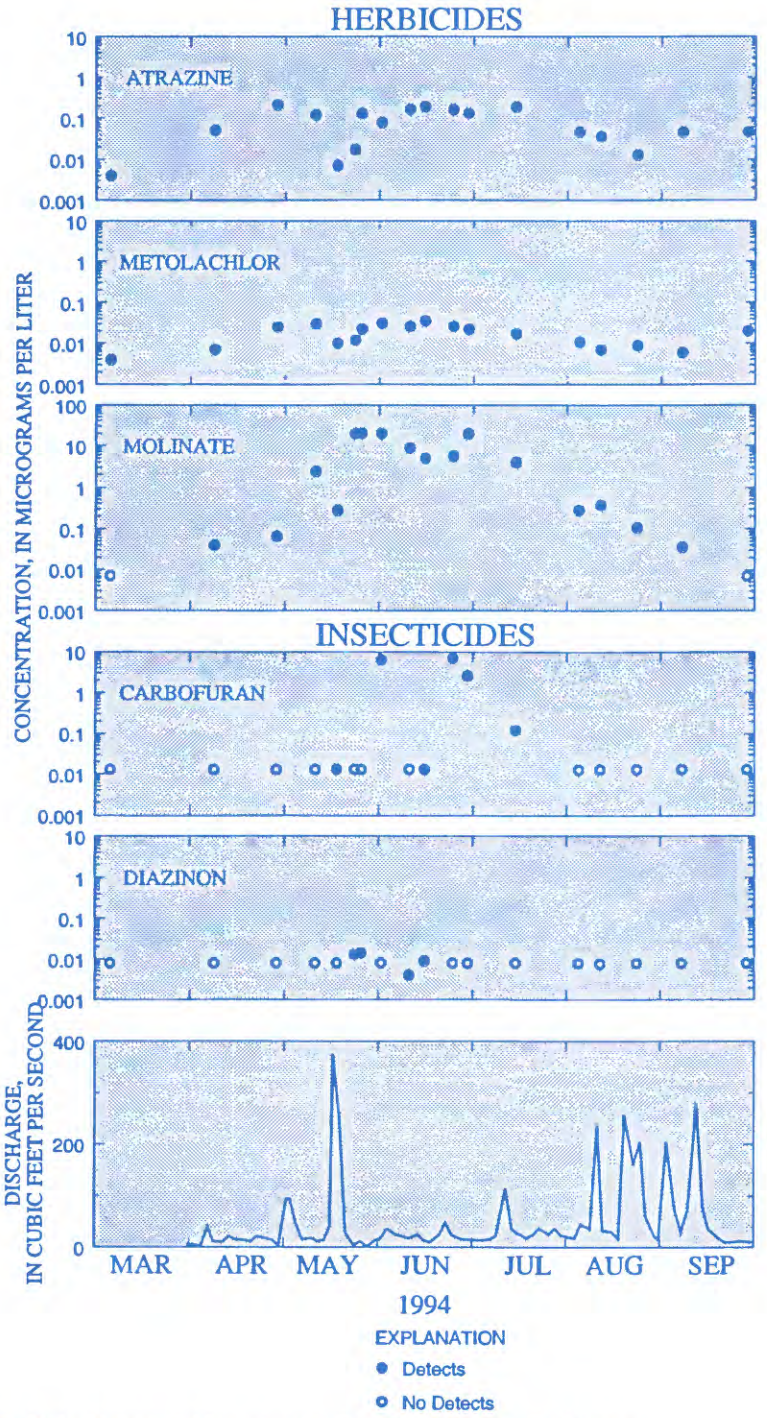

Figure 3. Selected pesticide concentrations and stream discharge.

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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