

Pesticide Occurrence in Streams, Groundwater, Fish, and Sediment in the United States

Description

Pesticides are used for various purposes in the United States, ranging from protecting large-scale agricultural crop production to domestic lawn and garden care. These pesticides, however, can impair water quality and cause adverse human and environmental health impacts. Table 19 presents a very limited range of data available from newly published surveys in the United States of the presence of pesticides in agricultural, urban, and undeveloped areas, and in fish tissue and stream sediments.

These data show that pesticides were detected in 97 percent of all stream samples taken from 1992 to 2001 in both agricultural and urban areas. Even in undeveloped areas, pesticides were detected in 65 percent of stream samples. Slightly lower levels of detection were reported for samples taken from shallow groundwater aquifers, but even in these water sources, more than half of all samples showed pesticide contamination in both urban and agricultural areas.

Similarly, organochlorine pesticides (such as DDT) and their by-products were detected in fish and streambed sediments in very large fractions of agricultural and urban samples. Fish were almost universally contaminated with organochlorine, and a disturbing 80 percent of sediment samples in urban areas contained these substances—even higher than the 57 percent found in agricultural areas. Most organochlorine pesticides have not been used in the United States for several years before the study period, so these data highlight their persistence in the environment.

Pesticides were also found in concentrations that exceeded human-health benchmarks (see the source for more data on these exceedance rates). Streams with pesticide concentrations exceeding human-health benchmarks were typically found in urban and agricultural areas.

Limitations

These results are based on data from a total of 178 streams in the United States, with samples taken over a decade. The results shown do not account for seasonal and

annual variations, which can be substantial due to changes in stream flow and the timing of pesticide application. Some sites were sampled in multiple years; others for only one or two years. Mean values were then used to summarize exceedance values. The pesticide findings are based on a time-weighted analysis of 4,380 water samples, adjusted to try to avoid biases caused by differences in sampling intensity among sites and seasons. Far more extensive sampling is needed, not just in the United States, but also in places where water-quality sampling may be limited or even nonexistent.

Source

Gillion, R. J., Barbash, J. E., Crawford, C. G., Hamilton, P. A., Martin, J. D., Nakagaki, N., Nowell, L. H., Scott, J. C., Stackelberg, P. E., Thelin, G. P., Wolock, D. M. 2006. *Pesticides in the nation's streams and ground water, 1992–2001*. 172 pp. United States Geological Survey, Circular 1291.

DATA TABLE 19 Pesticide Occurrence in Streams, Groundwater, Fish, and Sediment in the United States

Percentage of Time or Samples with Pesticide Detection			
	Agricultural Areas	Urban Areas	Undeveloped Areas
Streams	97	97	65
Shallow groundwater	61	55	29

Percentage of Samples with One or More Organochlorine Compounds			
	Agricultural Areas	Urban Areas	Undeveloped Areas
Fish tissue	92	94	57
Bed sediment	57	80	24