

## How Does Organic Farming Protect Water Quality?

### *Reduces/Eliminates Pesticide Runoff*

Organic farming and land management reduce or eliminate water pollution and helps conserve water and soil on the farm. According to the United Nations Food and Agriculture Organization (FAO), several countries in Europe compel or subsidize organic farmers to use organic techniques specifically to combat water pollution problems.



### *Reduces Nutrient Runoff*

Organic standards stipulates that soil fertility and crop nutrients can be managed through nurturing soil microbial activity, tillage and other cultivation practices such as crop rotation, which preserve and maintain the fertility of the soil so that synthetic inputs become unnecessary. Organic, therefore, eliminates the need and use of synthetic

nitrogen/phosphorus-based fertilizers, thereby significantly reducing the threats nitrogen and phosphorus runoff has on aquatic ecosystems and reduces the prevalence of algal blooms and eutrophication.

### *Prohibits the Use of Sewage Sludge/Biosolids*

Organic does not allow the use of sewage sludge, which is often contaminated with a host of chemicals, including heavy metals, pharmaceuticals and pesticides. These can all re-enter the aquatic environment once the sludge is recycled on land.

### *Prohibits Genetic Engineering*

Genetic engineering that incorporates the popular herbicide-tolerant, Roundup Ready corn and soybeans, or insecticidal genes into plants, is prohibited in organic. Genetically engineered (GE) crops have led to an increase in herbicide and insecticide use as farmers experience weed and insect resistance.

### *Conclusion*

Growing food with a reliance on toxic pesticides has resulted in the nation's waterways being heavily contaminated with toxic chemicals. Organic farming demonstrates clearly that relying on toxic chemical inputs for crop yields is unnecessary, while sustainable practices protect waterways and public health from chemical pollution. Creating healthy soils, which is the foundation upon which organic systems are built, conserve water and fertility, leads to less surface runoff, and reduces the need for nutrient input. Without toxic pesticide use, organic farming protects and improves the quality of the nation's waterways.

*A fully cited version of this brochure is available online at [www.beyondpesticides.org/water](http://www.beyondpesticides.org/water).*

# Organic Land Management and the Protection of Water Quality

Organic land management, including agriculture and its production of organic food, utilizes a system that seeks to maintain and improve the environment. Organic standards codified in the *Organic Food Productions Act* (OFPA) are subject to independent public review and oversight of practices and allowed inputs, assuring that toxic synthetic pesticides used in conventional, chemical-intensive agriculture are replaced by methods focused on soil biology, biodiversity, and plant health. This ensures that pesticides that contaminate our water and air, hurt biodiversity, harm farmworkers, and kill bees, birds, fish and other wildlife are reduced or eliminated completely.

Current laws to protect water quality are limited by risk calculations that offer limited public health and environment protection. The nation as a whole still relies on toxic inputs to grow food and manage landscapes. These chemicals, like atrazine, 2,4-D, and glyphosate, are linked to a myriad of human and environmental health concerns, including cancer, birth defects, reproductive and sexual dysfunction, and neurological/learning problems. The increasing rates of cancer, learning and behavioral effects, and infertility call for a serious reevaluation of the way we grow our food and protect our waterways. Organic farming and landscape management provide the model for transitioning away from chemical dependent to sustainable practices.



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## Conventional Farming Threatens Waterways

Conventional, chemical-intensive agriculture in the U.S. and its reliance of toxic, synthetic inputs, such as insecticides, herbicides, and synthetic nitrogen and phosphorus fertilizers, have affected the quality of surface and groundwater for decades. According to data from the U.S. Geological Survey (USGS) and the Environmental Protection Agency (EPA), of the over 300 food production pesticides with tolerances registered –allowable levels of pesticide residue on food– 52 are known surface or groundwater contaminants. (See Beyond Pesticides' *Eating with a Conscience* (EWAC) at [www.eatingwithaconscience.org](http://www.eatingwithaconscience.org).) The overwhelming majority of the most popular pesticides used in the U.S. have been detected in surface and groundwaters, including the popular herbicides atrazine, glyphosate, and 2,4-D.

## 10 Most Toxic Crops to Produce

Corn and soybeans are the most widely grown crops in the U.S. and as such contribute overwhelmingly to pesticide contamination, especially in the Midwest where these crops are predominantly grown, and pollution of the Mississippi River watershed and the Gulf of Mexico. Ninety percent of corn and soybeans are genetically engineered, which also correlates to an increase in herbicide use. EWAC indicates that of the 84 pesticides with established tolerance for corn, 22 are known to contaminate streams or groundwater. When it comes to soybeans, 26 of the 83 pesticides registered for use on soybeans contaminate streams or groundwater.

Conventional farming of bell peppers, potatoes, tomatoes, and wheat are the biggest contributors to water contamination after corn and soybeans. Asparagus, peaches, pears, and hot peppers round off the top 10 dirty crops that are grown with the most water contaminating pesticides. (See box for foods with most toxic production practices.)

Crops	2,4-D	Atrazine	Carbaryl	Chlorothalonil	Glyphosate	Malathion	Metolachlor	Paraquat	Pendimethalin	Permethrin
Soybeans	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sweet Corn	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bell Peppers		✓	✓	✓	✓	✓	✓	✓	✓	✓
Potatoes	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tomatoes		✓	✓	✓	✓	✓	✓	✓	✓	✓
Wheat	✓			✓	✓	✓	✓	✓	✓	✓
Asparagus	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Peaches	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pears	✓	✓		✓	✓	✓	✓	✓	✓	✓
Hot Peppers		✓		✓	✓	✓	✓	✓	✓	✓

## Pesticides Most Frequently Detected

### Urban vs. Agricultural

According to USGS' *Pesticides in the Nation's Streams and Ground Water*, the herbicide atrazine is the most frequently detected pesticide in surface and groundwater. The others most frequently detected nationwide are the herbicides metolachlor, simazine, prometon, and the insecticide diazinon. For insecticides, the most frequently detected are chlorpyrifos, carbaryl, malathion, diazinon, and carbofuran. For herbicides, atrazine, metolachlor, acetochlor, trifluralin and cyanazine are the five most frequently detected.

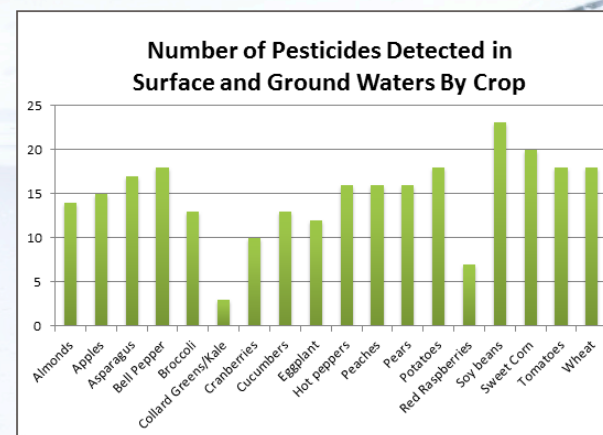
These pesticides are registered for use mostly on agricultural sites, but trifluralin, simazine, and prometon also have residential uses, while cyanazine's uses have been cancelled. 2,4-D is overwhelmingly detected in urban areas, due to its prevalence in lawn care products. Simazine and diuron are also detected in urban areas.

While the vast volume of pesticide runoff comes from agricultural areas, urban uses of pesticide products contribute to water contamination. Lawn applications, uses on rights-of-ways, and mosquito control applications lead to pesticide runoff into streams and rivers. One California monitoring study of urban creeks found pyrethroid insecticides in every sample collected. Here, bifenthrin was identified as the pyrethroid of greatest toxicological concern, followed by cypermethrin and cyfluthrin. Pyrethroids are commonly formulated in over-the-counter pesticide products for consumers or professional pest controllers. However, seasonal patterns of discharge of these chemicals into waterways are more consistent with professional use as the dominant source.

## Water Monitoring Continually Detects Pesticides

According to USGS, 56 percent of streams sampled have one or more pesticides in water that exceed at least one aquatic-life benchmark set by EPA. Urban streams have concentrations that exceed one or more benchmarks at 83 percent of sampled sites, mostly by the insecticides diazinon, chlorpyrifos, and malathion. Agricultural streams have concentrations that exceed one or more benchmarks at 57 percent of sites –most frequently by chlorpyrifos, azinphos-methyl, atrazine, p,p'-DDE, and alachlor. Pesticide compounds analyzed in water by USGS include many of the most heavily used herbicides and insecticides, and one or more pesticides or their degradates are detected in water more than 90 percent of the time during the year in agricultural streams, urban streams, and mixed-land-use streams.

Atrazine shows consistent patterns of high levels in U.S. waterways, especially in the Northeast, South, and Midwest regions of the U.S., demonstrating the prevalence of atrazine in surface waters. Agricultural streams located in the Corn Belt (Illinois, Indiana, Iowa, Nebraska, Ohio, and parts of adjoining States) and the Mississippi River Valley account for most concentrations that exceed benchmarks for atrazine.



The likelihood of pesticide concentrations exceeding a human-health benchmark is greatest for those streams draining agricultural or urban watersheds.

The herbicide glyphosate has also been detected in significant levels in rain and rivers in agricultural areas across the Mississippi River watershed. Glyphosate is also detected 60-100% of the time in both air and rain samples.